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THE

OPHTHALMIC REVIEW

A RECORD OF OPHTHALMIC SCIENCE

EDITED BY

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ON SOME CASES ILLUSTRATING THE VALUE OF PERIMETRY IN RECORDING THE COURSE OF OCULAR DISEASES.

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The method of taking visual fields commonly in vogue, by moving a test object of from 10 to 20 mm. in diameter along the arc of a circle the radius of which is approximately 30 cm., has from time to time been criticised as lacking in delicacy. Although by its means the limits of the field can be accurately mapped out, there is a large region between these limits and the fixation point in which such an object may be clearly seen, although the function of the corresponding portion of the retina is appreciably lowered. Among the suggested methods for testing these areas, those of Bjerrum and Groenouw may be mentioned. Bjerrum[1] employs white discs varying in diameter from 1 to 10 mm. at a distance from the eye of 1 to 2 metres; a large number of charts illustrating the very interesting results obtained by this method have been lately published by Meisling.[2] Groenouw[3] on the other hand uses as test objects small black spots, varying in size from $\frac{1}{4}$ to 4 mm., upon a white background. To employ his method, the surface of a circle of the required diameter in the middle of a piece of white cardboard 2·5 cm. square is blackened with Indian ink; the cardboard is then moved along the arc of an ordinary perimeter from the periphery towards the centre as in the usual method of taking a field, and the spots at which the black circle is recognised as such are recorded upon a chart. Groenouw claims that such small black spots are a much more delicate test for slight impairments of the field of vision than coloured spots of the size usually employed (*i.e.*, 3 mm. square and upwards), and quotes a case of retro-bulbar neuritis in which he found that the central scotoma for a 5 mm. red square extended only 4° or 5° from the fixation point, while that for a 1 mm. black spot reached 30° on every side; and also one of tabetic atrophy with V. = $\frac{6}{6}$ and full fields for 5 mm. squares of white, blue, red, and green in which

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[1] *Nordisk Ophthalmologik Tidsskrift*, vol. ii. p. 141.

[2] *Annales d'Oculistique*, December, 1900, and Ophthalmic Review, 1901, p. 162.

[3] Knapp's *Archives*, Bd. xxvi, p. 85.

A 4 mm. black spot	was seen	only to	20°	instead of	50° — 80°
A 2	,,	,,	12°	,,	40° — 60°
A 1	,,	,,	5°—8°	,,	10° — 40°

He also considers that the results obtained by testing with black spots are more reliable than those with colours, as the patient has merely to state how soon he sees the spot, and not to form a judgment as to whether he recognises a colour or not, and because different observers in taking colour fields may require the patient to distinguish the colours with different degrees of distinctness and so obtain varying results from the same case. To these advantages I should add that the test is applicable in colour-blind persons, and in one case of tobacco amblyopia in which the patient could not distinguish whether a cart was painted red or green, I was able to obtain definite evidence of the existence of a paracentral scotoma for a half-millimetre black spot, although the central vision had under treatment become almost normal. Another point is that the fields for black spots are said to be much less influenced by differences in illumination than those for colour. Meisling admits that the results obtained by Groenouw confirm those of Bjerrum, and as the test with black spots does not require any special apparatus, but can be rapidly applied during the course of an ordinary perimetric examination, it would seem likely to be more generally useful than that with small white objects at a greater distance. I have employed the black spots in a considerable number of cases and have found them very useful, although my results do not agree with the statement that they are more delicate than coloured test objects of the sizes usually employed. The lines on Chart *A* represent the limits of the field for black spots of $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, and 4 mm. as given by Groenouw, by whom they are named Isopters.

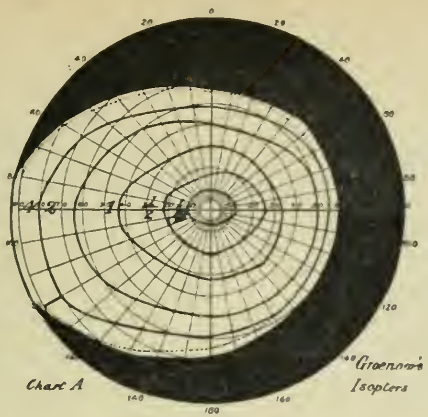
One point to which attention may be called is the necessity of stating accurately the size of the test object used and the length of radius of the perimeter. The method employed by Bjerrum of doing this is an excellent one. He writes the size of the test object in millimetres as the numerator of a fraction, the denominator of which is the length of radius of the perimeter in millimetres. Thus a field taken with a white circle 7 mm. in diameter or a perimeter of 30 cm. radius would be described as a field for white $\frac{7}{300}$.

The information obtained by these more accurate methods of testing the visual fields is no doubt very useful in establishing the early diagnosis of many ocular conditions, but I should like to call attention to a series of cases illustrating the value of fields taken by the ordinary methods in recording the progress of certain diseases, and more particularly to the improvement which may take place in such fields. Many of the charts published are those of fields taken by myself while acting as assistant to Mr. Richardson Cross, to whom I am indebted for permission to make use of them. The remainder were taken either by Mr. Cross himself, or by one or other of his previous assistants. All of them were taken by daylight with a Priestley Smith's perimeter, the head of a white hat pin 7 mm. in diameter being used as a test object. The ordinary or tangential method was employed, but the results obtained by it were checked in many cases by the circular method, *i.e.*, the test object fixed by a clip to the arc was rotated so as to move in a circle round the fixation point, and the positions in which it was seen were marked on the corresponding meridian on the chart.

Case I. Optic Atrophy.—Miss M. L. came on March 9, 1899, complaining that her left eye had long been faulty, and her right had been failing for sixteen months. She had a bad family history, a sister $1\frac{3}{4}$ years older than herself being weak minded and having suffered from interstitial keratitis, and an uncle being epileptic. Vision = R.—5·50, with — 2 c. = $\frac{6}{18}$;—2 with—2 c. = J. 12; L. $\frac{6}{0}$. The right field was much contracted, as shown by chart *a*, while the left extended barely 10° from the fixation point. Both nerves, especially the left, were atrophic. This patient has now been under observation for over two years, and has been treated with rest, galvanism, mercury, and tonics, as seemed advisable from time to time. The left eye rapidly got quite blind, but in spite of the unfavourable nature of the case the central vision of the right has slightly improved, while its field when last taken was rather larger than at the previous testing, although it is considerably more contracted than when she was first seen. (See Charts *b*, *c*, and *d*.)

Case II. Functional Amblyopia.—Miss T., aged 33, came in October, 1894, complaining of failing vision in the right eye. The left eye had always been faulty, with a tendency

CHART *A*.



Groenouw's Isopters.

CASE I.

Right.

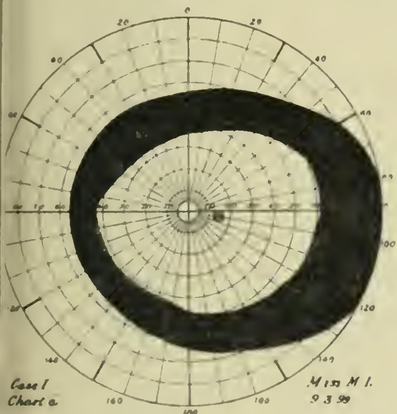


Chart *a*. March 9, 1899.

Right.

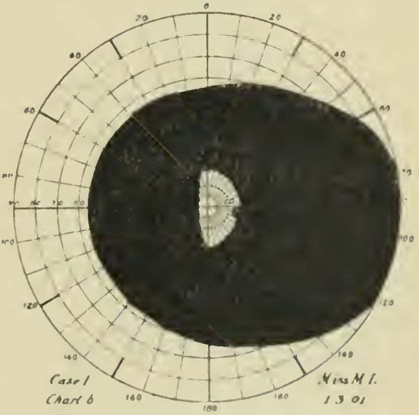


Chart *b*. March 1, 1901.

Right.

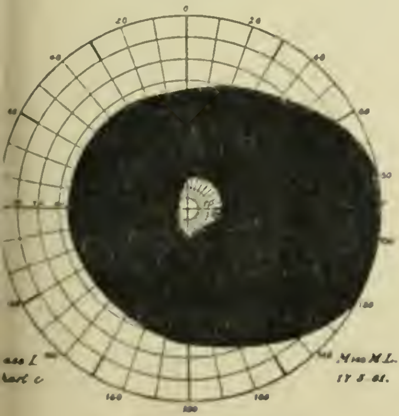


Chart *c*. May 17, 1901.

Right.

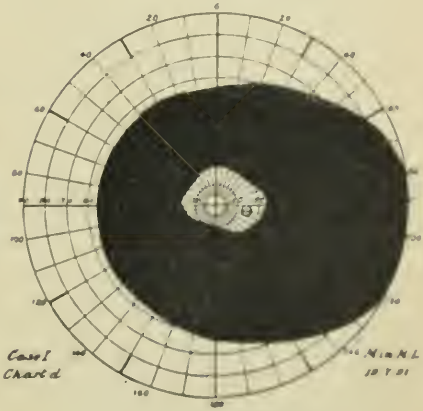


Chart *d*. July 7, 1901.

to diverge, and had suddenly got worse four months previously. When first seen it was practically blind from hæmorrhagic retinitis, and later its retina became detached and cataract developed. The right eye was said to have been perfect in June, but in October its vision was $\frac{6}{12}$ and J. 6; with + 1 D.=$\frac{6}{9}$, + 2 D. J. 1, while the field was much contracted (Chart *a*). Excepting a slight paleness of the nerve, no defect could be discovered in the fundus, which has remained practically normal up to the present time. The patient's vision has varied from $\frac{6}{12}$ to $\frac{1}{60}$, while her field has at times been limited to an area extending only two or three degrees from the fixation point (Chart *b*). In spite of this she has always been able to go about alone, and has nursed her relatives in numerous illnesses. She seems most plucky and anxious to make the best of everything, yet everyone who has had her under observation believes that she really can see much more than she admits even to herself. The case shows well how long such functional amblyopia may last without the patient being blind, in spite of the very hopeless-looking results obtained by testing the vision.

Case III. Congestion and Chronic Glaucoma relieved by Iridectomy.[1]—Capt. B., aged 71, had already lost his left eye from hæmorrhagic glaucoma. During 1898 his right eye began to fail, and in March, 1899, its field was slightly contracted. His central vision was $\frac{6}{7}$, the nerve was distinctly pale and one of the retinal arteries pulsated markedly, but there was no cupping. The patient was ordered pilocarpine, and his condition remained unaltered until January 2, 1900, when he came again with his central vision still good, but his field narrowed to within 10° or 15° of the fixation point (Chart *a*). The optic nerve was white and flat, but there was very definite pulsation of the main trunk and branches of the central retinal artery. There was no marked increase of tension. On January 6 a good peripheral iridectomy was done, with the result that

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[1] This case has already been reported in full by Mr. F. R. Cross (*Brit. Med. Jour.*, 1900, ii.).

CASE II.

Right.

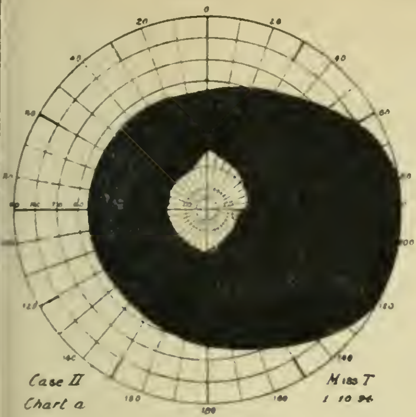


Chart *a*. October 1, 1894.

Right.

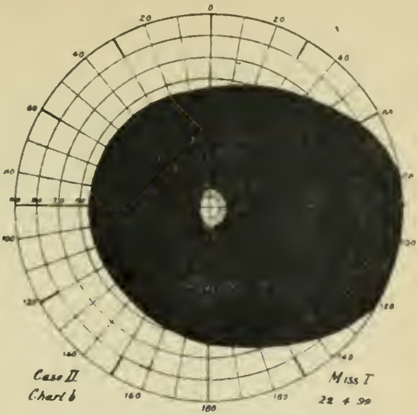


Chart *b*. April 22, 1899.

CASE III.

Right.

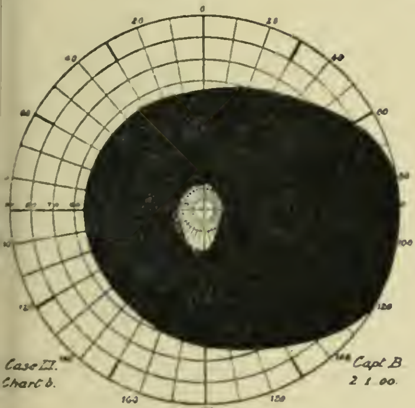


Chart *a*. January 2, 1900.

Right.

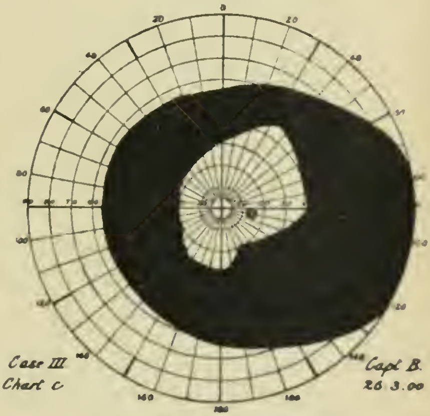


Chart *b*. March 26, 1900.

CASE IV.

Left. Right.

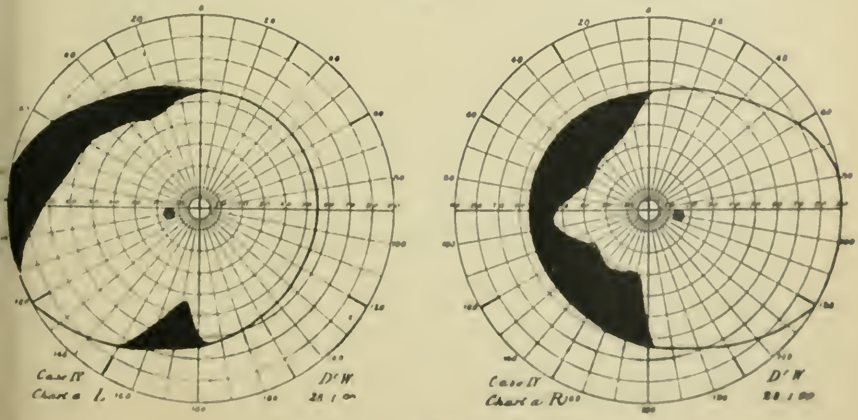


Chart *a* January 25, 1899.

after a prolonged convalescence owing to hæmorrhage into the interior chamber, the eye recovered, and on March 26, 1900, the vision in it was $\frac{6}{9}$, while the field was enlarged as shown in Chart *b*.

The case shows that when a concentric contraction develops rapidly in an eye in which a typical glaucomatous narrowing of the nasal field had previously existed, it may depend upon congestion, and be improved by relieving the excessive tension, even if definite optic atrophy is known to be present as a complication. In this case there was whiteness of the nerve, so marked that it was looked upon as contra-indicating operation until the concentric narrowing set in; but in spite of this a marked improvement resulted from an iridectomy, and has been maintained up to the patient's last visit, *i.e.*, for over eighteen months.

Case IV. Symmetrically placed Defects accompanying Hemiplegia.—Dr. W., aged 73, had a slight attack of left hemiplegia on January 1, 1899. On January 28 he came complaining of mistiness on the left side. His central vision was normal, but both his fields were defective on the left side (Chart *a*). On May 9, 1899, he came again, reporting that he was very much better, and with the exception of a slight numbness of the left hand had no sign of the attack left. His fields were almost normal (Chart *b*).

Case V. Acromegaly.—Chart *a* represents the fields of a patient suffering from acromegaly, when the disease was about at its worst. Chart *b* represents the fields of the same patient a year and a half later. As the case will be published in full by Mr. Cross, I merely print the charts as illustrating the improvement which may take place in such a case.

Case VI. Hemianopsia accompanying Double Optic Neuritis dependent on Intracranial Tumour; Marked Improvement in Central and Peripheral Vision.—Miss L. W., aged 20, came on December 4, 1900, complaining of failing vision in the right eye. She was stated to have always had a faulty left eye, the defect being inherited, but there is no proof of the correctness of this opinion.

Left. CASE IV.—*Continuea.* Right.

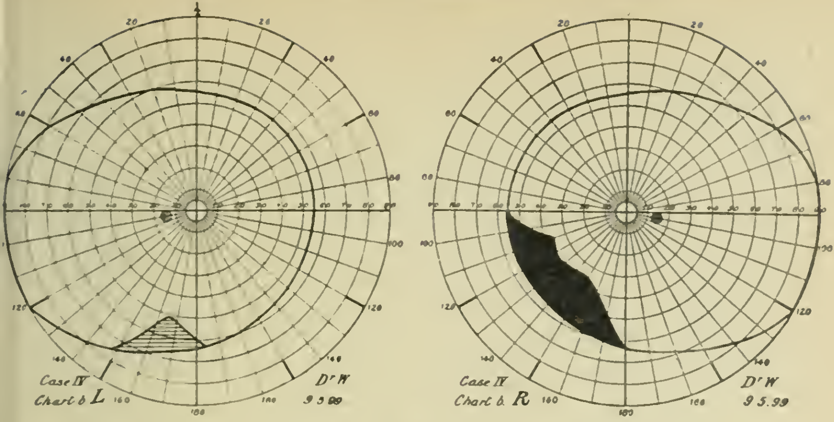


Chart *b*. May 9, 1899.

CASE V.

Left. Right.

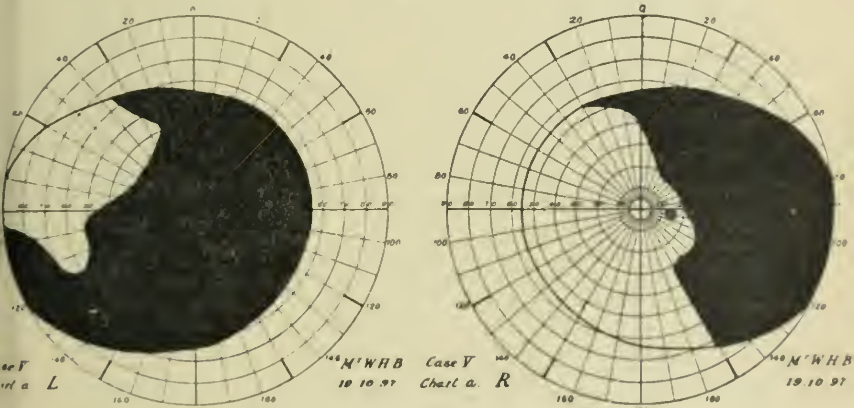


Chart *a*. October 19, 1897.

Left. Right.

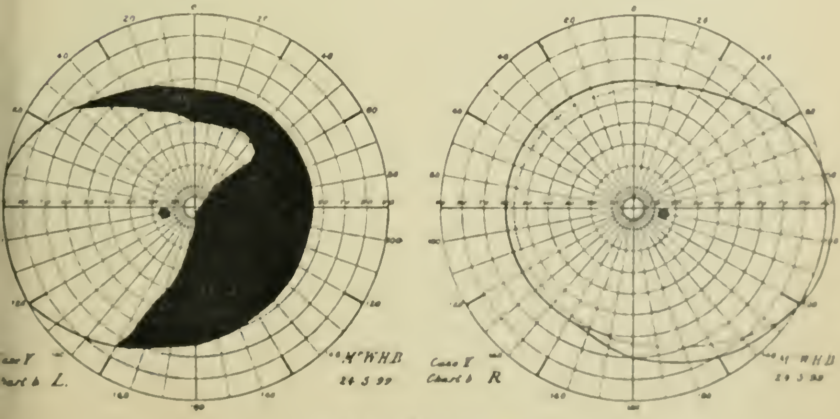


Chart *b*. May 25, 1899.

When travelling in Scotland two months previously she had had a seizure of some kind without any known cause, during which she looked pale, had shivering fits, and could not walk, so that she had to be helped out of the train. Next day she had sufficiently recovered to go out, and she kept better until five weeks later, when she woke up one morning with intense pain in the head ; this passed off in a few hours, but since that time she had suffered from general weakness.

When first seen the vision of the right eye was $\frac{6}{12}$ and J. 1 with difficulty, that of the left $\frac{6}{60}$, J. 16. Neither eye was improved by lenses. The fields were contracted, as shown by Chart *a*. Both nerves were inflamed, with typical choked discs, and the case was diagnosed as one of cerebral tumour. On January 23, 1901, the patient's symptoms and general health were much better, but the vision had markedly deteriorated, being now, with the right eye, letters of J. 19, with the left, letters of J. 18. Perception of colours in large masses was doubtful in the right eye, but more satisfactory in the left. With the perimeter a white pin-head could not be seen in any part of the field, but a piece of white paper, 2 in. square, was seen by each eye on the nasal side in areas corresponding to the shaded parts of the Chart *b*. On February 5 the vision of the right eye had improved to $\frac{6}{60}$ and letters of J. 16, while that of the left was practically unaltered. The field of the left eve was if anything more defective in the upper nasal quadrant, but in the right there appeared to be some vision on the temporal side and at the fixation point. On February 17 the vision of the right eye was markedly improved ($\frac{6}{12}$ and J. 10), and the fields of both eyes were also better. On June 7 the patient's vision was = R. $\frac{6}{8}$ good, L. ? $\frac{6}{60}$. Her fields for a white pin-head were as shown by Chart *c*, and centrally she was able to see small spots of colour with the right eye, and 3 mm. spots with the left.

The neuritis, as such, had almost disappeared, the disc being very slightly swollen, the blood vessels seen uninterruptedly, while the nerve was becoming pale and

CASE VI.

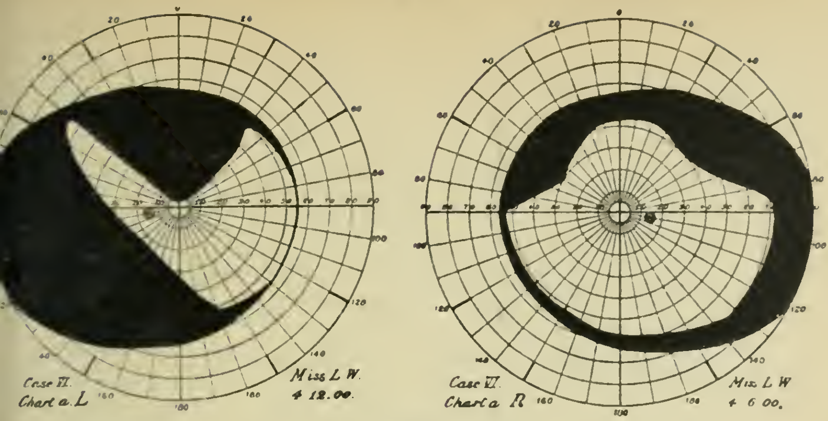

Left. Right.

Chart *a*. December 4, 1900.

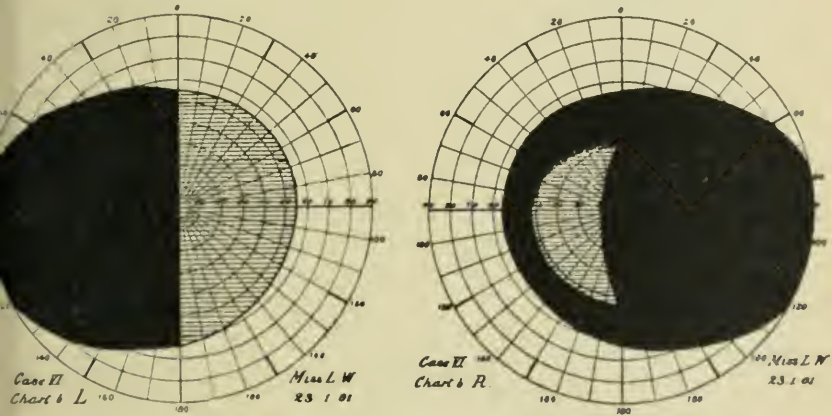

Left. Right.

Chart *b*. January 23, 1901.

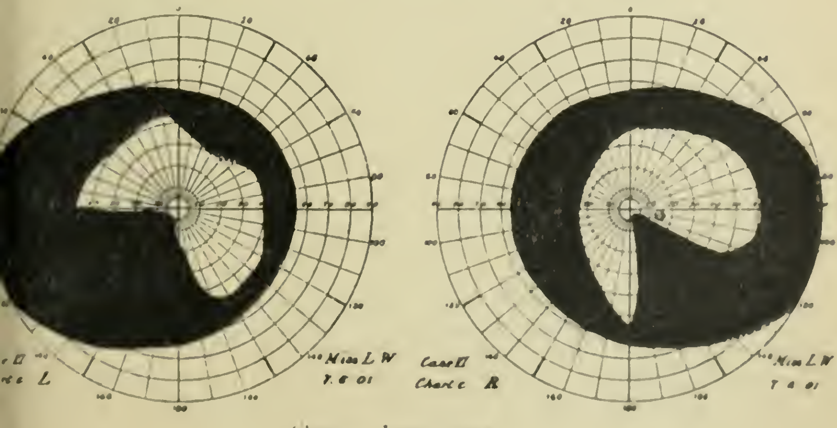

Left. Right.

Chart *c*. June 7, 1901.

atrophic-looking Her general health was very much improved, the only peripheral symptom being sciatica on the left side; but she was still somewhat weak.

Case VII. Choroido-Retinitis with Large Central Scotomata in both Eyes: Recovery.—Miss W., aged 14, came on December 5, 1898, complaining of loss of sight. A month previously she had consulted a London oculist on account of headaches, and had been ordered glasses—6 for distance and—2 for reading in each eye, so that it may be inferred that apart from myopia there was nothing wrong then. During November her sight became gradually worse, and from the middle of the month it was so defective that she could not go to school. When first seen, the vision was = R. $\frac{6}{0}$ and J. 16, eccentrically, L. $\frac{6}{0}$ and not even J. 20, while the fields were as shown in Chart *a*. In the right eye there was choroiditis with retinitis, œdema around the macula lutea, and distinct pigmentation in the macula. In the left there was diffuse choroiditis, most marked around the macula lutea.

Two months later the fields were much improved (Chart *b*), and the vision was = R. J. 16 eccentrically, L. J. 1, —6 $\frac{6}{9}$. It will be noticed that in spite of the great improvement in central vision there was still a good sized paracentral scotoma in the left eye, while in the right a smaller scotoma caused much greater disturbance of vision because it actually occupied the macular region. Another point is that the scotomata for white were almost, if not quite, as large as those for colour, showing in this respect a marked contrast to those due to toxic amblyopia.

Case VIII. Central Choroiditis with Incipient Optic Atrophy in a Heavy Smoker.—Rev. D. B. came on May 3, 1898, complaining that for the previous two months he had found the sight of the left eye very defective. He admitted smoking a quarter of a pound of shag per week. On testing, his vision was found to be =, R. $\frac{6}{12}$; with —·50 = $\frac{6}{9}$; with + 2 = J. 1; L. $\frac{6}{0}$ J. 20, not improved by lenses. His fields were as shown in Chart *a*. In the right eye there was a pallid nerve with a deep physiological cup: in the left there was an atrophic nerve with pulsating veins, while

Left. CASE VII. Right.

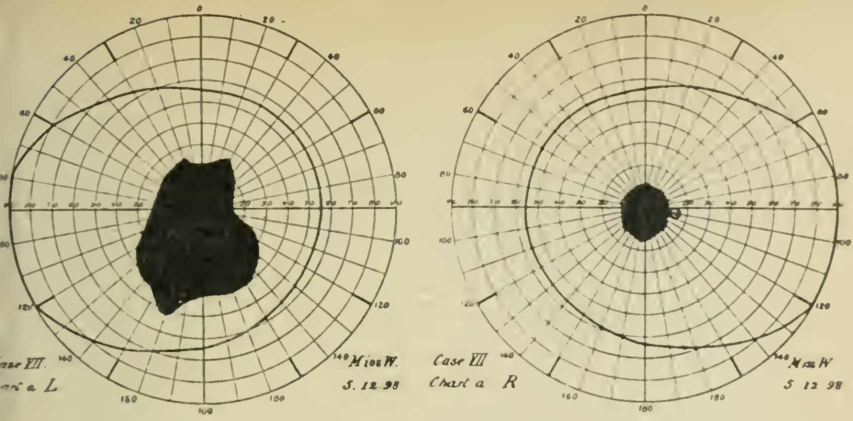


Chart *a*. December 5, 1898.

Left. Right.

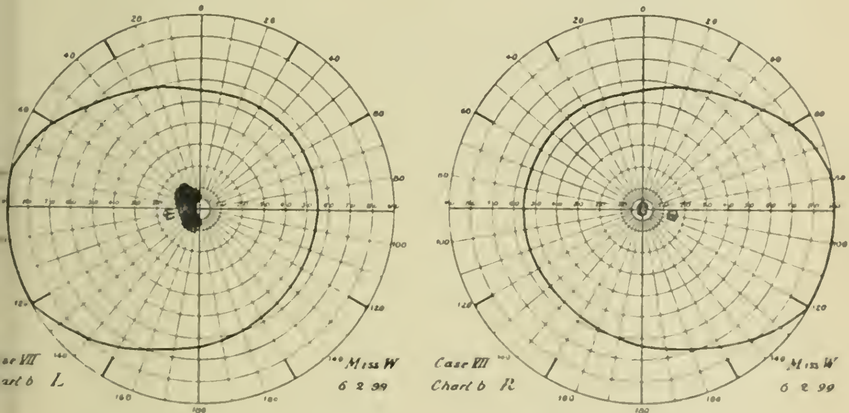
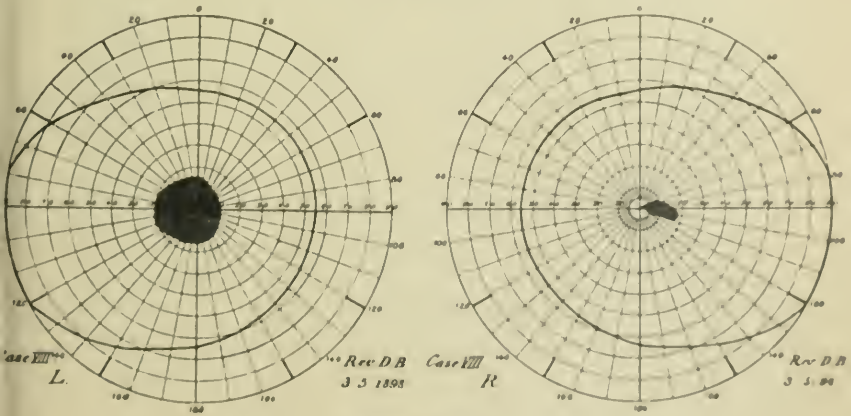


Chart *b*. February 6, 1899.

Left. CASE VIII. Right.



May 3, 1898.

there were also fine choroidal changes at the macula lutea. On July 20 (ten weeks later), he came with the vision of his right eye reduced to $\frac{6}{36}$ J. 16, but its field unaltered. On examination this was found to be due to macular choroiditis. He remained under treatment on and off for a long time, with a result that on June 29, 1899, his vision was = R. $\frac{6}{10}$ and with suitable lenses J. 1; L. $\frac{6}{24}$ and with lenses, J. 8, while his fields were almost normal. The scotomata for white had quite disappeared, but there were still small scotomata for a 2 mm. red spot, that in the left eye being central and that in the right paracentral. These scotomata were not found when larger red spots were used. This improvement was maintained until February, 1900, since when he has not paid another visit.

It is rather difficult in this case to say how much of the defective vision depended on toxic influences and how much on the macular choroiditis, but it shows that even when the latter is present there may be definite improvement under a prolonged course of treatment.

REVIEWS.

L. DE WECKER (Paris). The Extraocular Complications of Sympathetic Ophthalmia. *Annales d'Oculistique, October*, 1901.

In the Graefe-Saemisch Handbook the paper (by Schirmer) dealing with sympathetic ophthalmia, although extending to more than 200 pages, contains only one describing phenomena of this origin, but affecting other parts of the body, and it contains two expressions with which de Wecker seems to be dissatisfied: "The development of sympathetic ophthalmia is but rarely complicated with morbid phenomena affecting other parts of the body," and "In view of the extreme rarity of these complications the author (Schirmer) finds himself obliged to regard them as fortuitous coincidences." With at least the first of these statements most surgeons will be inclined to agree, but de Wecker is of a somewhat different opinion, and by way of illustration describes two cases, the first of which was reported by Rogman in 1900, while the second came under his personal knowledge.

Rogman's case was that of a man, aged 59, who had had perfect health, and who appeared to have no liabilities on the part of his nervous system, from whose left eye he extracted a cataract by the "combined" method; the operation was followed by irido-choroiditis, and in four weeks by sympathetic ophthalmia. By the end of three months, not only had both eyes atrophied completely, but the unfortunate patient had become totally deaf, "almost suddenly, without pain or apoplectic attack." No doubt it would be some little consolation (to the operator) to believe that this terrible occurrence could be regarded as nothing but a fortuitous circumstance.

In de Wecker's own case there was no operation which could, even remotely, be blamed for the misfortune. The patient was a man aged 47, a missionary in the Seychelles Islands, who had enjoyed good health during a long residence in the tropics. He was engaged in building a church, when on December 23, 1890, as he stood close by a man who was dressing a piece of granite, his left eye was injured by a flying chip. The cornea had been cut through and the iris wounded, as was evident on examination of the globe, enucleated long afterwards. At first there was violent pain for three or four days, but this gradually calmed down; as it did so complete blindness of the injured eye came on, save for perception of bright light to the outer side. Three weeks later he had fever with recurrence of severe pain in and about the injured eye, and two days after that the right eye began to suffer pain also, and sight to become dim; in three days it was gone.

At the same time an extreme exaggeration in the perception of sounds was complained of, but not until the end of January did this become painful; for a fortnight thereafter the sensation was intensely distressing, but then hearing became rapidly lost, and in a day or two more he was completely deaf.

The left (injured) eye was enucleated on June 1, it being then quite soft, but retaining perception of bright light to outer side. The right eye presented the typical appearances of sympathetic ophthalmia; it still had poor perception of light, with some photophobia. For some little time after the operation the recurring attacks in the other eye seemed to be more painful than they had latterly been.

De Wecker first saw the patient in the following July. He at once resected the stump of the optic nerve and injected into the apex of the orbit corrosive sublimate solution (1-1000). These injections were three times repeated, when pretty severe reaction came on with rise of temperature. At the same time mercurial inunction was vigorously carried on. Under this treatment, severe but necessary, in de Wecker's opinion, the condition of the eye began to show some signs of amendment, pains became lessened, the cornea cleared a little, and the iris looked better; at the same time the deafness ceased to be so absolute; with the right ear he could be made to hear spoken words. The only visible evidence of a pathological condition in the ears which the aurists could find at this time was a trace of otitis interna; otherwise the ears showed nothing, and those who examined him were of opinion that the condition must be due to the migration of micro-organisms from the eye wound by the base of the skull to the auditory nerves. The improvement in hearing was but temporary, however, and at last the patient tired of a method of treatment at once so painful and so unproductive of benefit. The author does not attribute the temporary improvement to the mercurial injections (which he would never have dared to employ in that way had not the case been extreme, and one in which "a fatal termination would have been a deliverance to be desired") so much as to the inunction. Four years later the patient died of influenza.

Snellen reported the only similar case which de Wecker has been able to trace. It was that of a man, aged 27, who came with a purulent inflammation of cornea and lens, the result of an injury sustained when opening a bottle three weeks previously; the cornea was then incised and the lens removed because the eye had been very hard and painful. Enucleation was not performed at the time because of the purulent condition and because the ciliary body was not injured. In a few days, however, intense sympathetic ophthalmia manifested itself, with violent pains in the head, deafness, and delirium. The injured eye was then enucleated, when the patient's general condition greatly improved, but he remained entirely deaf as well as blind.

De Wecker draws an analogy between such a case as that which he describes and the not infrequent examples of deafness occurring during the course of interstitial keratitis, or rather during the irido-choroiditis which so often accompanies interstitial keratitis—an analogy which seems a little strained.

W. G. S.

L. WELT (Geneva). Thrombosis of the Central Artery of the Retina.

SCHWEIGGER (Berlin). On Embolism of the Central Artery of the Retina. *Knapp's Archives of Ophthalmology, September*, 1901.

The first of these articles is an abridged translation of one which appeared in the German edition of the *Archives*, and which has already been noticed in the OPHTHALMIC REVIEW for December, 1900. It is of interest on account of the short time which elapsed between the first ophthalmoscopic observation and the death of the patient (seventeen days), a condition from which some valuable pathological observations might be expected. It is to be noted, however, that the case differs from ordinary ones of arterial obstruction in the following respects:—

(1) The patient, who was a pregnant woman, aged 34, was from the first exceedingly ill with symptoms of nephritis

and ulcer of the stomach; the sudden failure of vision was immediately preceded by violent hæmatemesis with partial loss of consciousness.

(2) At the first ophthalmoscopic examination, which took place five days later, both eyes were very similarly affected. In both the margins of the disc were blurred; in both there was partial detachment of the retina; and in both there were white spots and small radiating hæmorrhages such as are found in cases of albuminuria.

(3) As the result of rest and digitalis the vision of both eyes was temporarily improved. At a second ophthalmoscopic examination the detachments in both eyes were said to have disappeared.

Here was obviously a very complicated case. Still, the existence of cloudiness of the central regions of both retinæ, together with the typical cherry-red spot, taken in conjunction with the marantic condition of the patient, were no doubt sufficient to arouse the suspicion that the central artery in each eye might be thrombosed.

The results of the microscopical examination as here detailed, although interpreted by the author as a confirmation of the diagnosis of thrombosis, do not appear to the reviewer to lend much support to it. "In the right eye there was a fresh blood-corpuscle thrombus of the central artery and its branches. In the left a fresh blood-corpuscle thrombus of the central vein." Now, to quote the author's own words, "It is clear that the sudden diminution of vision and the picture of embolism three weeks before the patient's death were not due to the thrombus found in the central artery of the right eye, nor to the thrombus found in the central vein of the left, since these thrombi were of more recent date." In fact, the author has to rely for a justification of the diagnosis on a previous hypothetical thrombosis of the central artery in each eye, in support of which absolutely no pathological evidence is adduced.

Professor Schweigger, in his short article, supports the view that cases ordinarily diagnosed as embolism of the central artery are commonly due to endarteritis. He goes further than this, and opines that in the rare event of embolism actually occurring, cloudiness of the retina with a cherry-red spot at the macula is not an early symptom. It was not in the classical case described by von Graefe, where the retina remained transparent a week after the onset of blindness; on the other hand the symptom is too often seen in cases where embolism seems to be the only tenable hypothesis, for the reviewer to accept Professor Schweigger's view. The cause of the cloudiness, or "infiltration of the retina" as it used to be called, is a matter which has never been satisfactorily explained. Is it directly caused by an interference with the circulation, or by an injury to the retinal structure itself? The latter would very quickly follow from any obstruction to the circulation, and the author refers to a case where the cloudiness and cherry-red spot were seen after a gun-shot wound which probably severed the nerve, and at any rate did not stop the circulation. The somewhat similar appearance seen in rare cases immediately after a blow on the eye ("commotio retinæ") may be due to the same cause.

A. Hugh Thompson.

FELIX LAGRANGE (Bordeaux). Tumours of the Eye and Orbit. Vol. I., Tumours of the Eye. *Paris, G. Steinheil*, 1901.

The vast amount of information, laboriously collected by the author during a number of years, and dealt with in an intelligible and lucid style, makes the present handsome volume a valuable work of reference. This, the first volume of the treatise, extends to nearly 900 pages. Its scope is indicated by the following headings of the several parts of which it is composed: (1) Tumours of the Bulbar Conjunctiva; (2) Tumours of the Sclerotic and Cornea; (3) Tumours of the Uveal Tract; (4) Tumours of the Retina and (5) Pseudo-tumours of the Eye. The remaining parts are to form the second volume, viz., (6) Tumours of the Optic Nerve; (7) Tumours of the Orbit; (8) Tumours of the Lachrymal Apparatus; (9) Tumours of the Lids; (10) Tumours which Invade the Orbit from Neighbouring Structures. The first and second parts contain the history of epibulbar tumours. The third part, tumours of the uveal tract, is almost exclusively devoted to tumours of mesoblastic origin and especially to every variety of sarcoma, the tumours arising from the pigmented epithelium not being included under this heading. The leuco-sarcomata are described separately; the number of these cases being still sufficiently limited, it has been found possible to collect and place together in one chapter all the carefully studied cases of these growths. Tumours derived from the two layers of the secondary optic vesicle, comprising benign and malignant tumours, are dealt with in Part IV. of this volume, the latter are described under three headings: (1) Gliomata of Retina; (2) Tumours of the Pars Ciliaris Retinæ; (3) Tumours of the Pigmented Epithelium. Tubercular and syphilitic lesions are placed in Part V., with the pseudo-gliomata and ossification in the eye. The book is printed in good large type, and is furnished with numerous very excellent plates and figures (202 figures in the text and 18 plates). Equal importance is given to the clinical and anatomical aspect of the subject. We hope to see the next volume provided with an index in addition to a table of contents, as it would considerably enhance the usefulness of the work. Now that medical literature has assumed such enormous proportions, this book, which contains the author's own valuable cases, and in which the literature of certain subjects is also collected and prominence given to that in it which is of importance, will certainly and deservedly be welcomed.

R. GREEF (Berlin). Guide to the Microscopic Examination of the Eye. Translated by Hugh Walker, M.A., M.B., C.M.Glasgow. *Rebman, London*, 1901.

This little book supplies a want of which every one who has cut sections of an eyeball is aware; the peculiar structure of the eye necessitates special methods of handling, if the relations of its parts are to be preserved, and little or no information on the subject is to be found in the usual text-books of pathological anatomy. Professor Greeff has here brought together all that is interesting to the ophthalmologist concerning the means of preserving, mounting and staining tissues; nor is it a mere collection of methods and formulæ: the descriptions of the processes, though concise, are obviously written by one who has an every-day acquaintance with them and knows their difficulties. He does not multiply variants, but gives one method or two which he has proved to be good; the best results are obtained when one knows one method thoroughly. He tells one the best ways of obtaining the material, of dividing the globe, of hardening and embedding, cutting and staining; describes the various morbid processes found in the eye; and finally, treats of the structures which are special to the eye, and of the modes of demonstrating them. In this last part of the book one gets incidental glimpses of a very fascinating field of study, that of the comparative anatomy of the ocular structures.

The book thoroughly fulfils its purpose as a practical guide to those ophthalmic surgeons who like to follow up the pathology of their cases for themselves, and it is good evidence of its usefulness that a second German edition has been followed by translations into French and Japanese, as well as into English. For our edition we are much indebted to Dr. Hugh Walker, who has produced an excellent and accurate version of the German text.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Clinical Meeting, December 12, 1901.

Mr. David Little (the President) in the Chair.

The following cases and specimens were shown :—

(1) *New Growth of the Orbit.*—Mr. H. Work Dodd exhibited two microscopical specimens, two photographs of the patient taken before removal of the growth, two microphotographs of a portion of the tumour, and two coloured drawings of the appear-

ance under the microscope. The portion of this growth shown under the microscope was evidently carcinomatous in origin, arising most probably from one of the skin appendages, root-sheath of hair follicle or Meibomian gland.

The section showed groups of alveoli arranged in rounded masses, and embedded in a stroma of firm connective tissue infiltrated with round cells. The alveoli were circular in outline and filled with spheroidal cells, having large pale nuclei. The section of the preauricular gland showed similar characters ; the tubular structure of the alveoli, however, was more marked. Some of the cells in both the original growth and in the preauricular gland were enlarged and filled with a clear transparent material.

Attention had been first called to this growth eleven years ago by a pricking sensation felt under the right upper eyelid, which on examination proved to be caused by a small red protrusion about the size of a pin's head. In four years it had increased in size to that of a pea, when it was snipped off ; two years later a lump, quite painless, appeared at the outer part of the right upper lid, which remained *in statu quo* for two years, when the patient became pregnant ; the lump then began alternately to " gather and discharge," but after confinement it completely dried up. During the last two years it had steadily continued its course as a painless, spreading sore under the lids of the right eye. Four months ago a discharge of blood and pus came from the orbit, after great pain, which was referred to the back of the eyeball, had been experienced. The preauricular gland then became enlarged. There was no definite specific history ; patient had had one child and three miscarriages. As the growth had increased and spread over the margins of the orbit it was removed, and the whole orbit cleared out, together with the portion outside the orbital margin, which latter was also chiselled away. The lachrymal gland was quite normal.

In the discussion Mr. Jessop suggested that the decision as to nature of the growth, whether endothelioma or rodent ulcer, should be left to the Committee on Growths.

(2) *Aniridia.*—Mr. Henry Juler. The left eye of a woman, aged 59, showed complete absence of the iris and opacity of the lens, the ciliary processes could not be seen ; the vision was less than $\frac{6}{60}$, but there was no photophobia ; tension normal. The other eye had been removed on account of panophthalmitis and glaucoma following an injury three weeks previously, the tension being + 2 at the time, with a yellow exudation into the anterior chamber. On section of the injured eye, only a narrow band of iris was

present, bordered by pigment, and varying greatly in width ; at one part the iris was entirely absent. The edge of the lens was also irregular and partly opaque, while the suspensory ligament was visible.

This patient's daughter had also lost her right eye from glaucoma ; her left eye showed complete absence of the iris ; the lens was opaque and dislocated upwards, the ciliary processes being clearly seen by oblique illumination ; the tension plus, with occasional pain. This latter patient was shown by Dr. Batten before the Society in May, 1900.

In the discussion which followed, Mr. Devereux Marshall said the occurrence of glaucoma in cases of congenital aniridia was the rule rather than the exception. In all the cases seen by him the narrow rim of iris was invariably present and all the cases had glaucoma, due in all probability to the peripheral part of the iris causing blocking. Mr. Treacher Collins entirely agreed with Mr. Marshall, and stated that in specimens he had examined there were tags of iris passing between the iris and ligamentum pectinatum, which also tended to cause blocking.

(3) *Retinal Pigmentation.*—Mr. Henry Juler. The right eye in this patient, a girl, aged 21, showed in the lower and outer quadrant of the fundus a number of variously sized pigment patches, grouped along the course of the inferior temporal vessels. Some of the patches were dark brown in colour and finely granular, others coal-black ; in places the pigment appeared to be wrapped round the vessels. A little removed from this group of patches, and more towards the periphery of the fundus, a larger patch of choroidal disturbance was to be seen. The left eye also showed a similar patch of choroidal disturbance, and similarly situated, but larger. The vision of the right eye $= \frac{6}{6}$ and J. 1, field of vision full. The left vision $= \frac{6}{6}$ and J. 1. The patient, who was of dark complexion and slightly anæmic, had two pigmented moles on her back. She had complained for the last four months of seeing a floating line in front of her right eye. Mr. Juler considered the condition to be congenital, the vision and ophthalmoscopic appearance not having changed in the least for some considerable time.

In the discussion following, Mr. Holmes Spicer asked whether Mr. Juler had entirely excluded congenital syphilis in the diagnosis, since the appearance of the pigment made the case appear of exactly similar nature to certain examples shown by Mr. Sydney Stevenson, of pigmentation in congenital syphilis. The presence also of choroidal atrophy introduced an element of doubt as to the diagnosis.

(4) *Retinitis Proliferans.*—Mr. H. Juler. In the right fundus of the patient, a woman, aged 25, a large yellowish-white patch was visible at the macular region, raised and pigmented on its summit. From the lower and outer part of the patch a white band was seen passing upwards, sweeping round to the right and coming well forward into the vitreous, with many fine arborescent striæ stretching from it. In the periphery of the fundus other raised white patches and striæ were seen, some with a glistening surface and with recent hæmorrhages upon them. The vision in this eye was only finger-counting, and that peripherally. The visual fields showed a central scotoma together with another isolated scotoma probably caused by this white mass; the field was contracted outwards as well. Mr. Juler considered the case should be classed as retinitis proliferans. The patient was shown before the Society in 1897, as a case showing peculiar macular changes. There was no history of any injury to the eye at any time.

(5) *A Child with Congenital Thickenings of Conjunctiva, Opacities of the Cornea, and a Notch in the Left Lower Lid in the Vicinity of the Outer Canthus.*—Mr. E. Treacher Collins. This patient, a girl aged 6, showed a shallow notch at the extreme outer part of the left lower lid, which gave the appearance of a re-duplication of the outer canthus. The right eyelids were normal, the left cheek-bone was less prominent than the right. The left cornea showed two faint opacities covering the outer and lower part of the margin. Extending some little distance upon the right cornea itself there was a dermoid growth, densely white in character, with no hairs on it. In each eye overlying the upper and outer part of the globe beneath the upper lid a fibro-fatty growth was to be seen. In the neck, in the middle line and extending outwards to the left auricle, was an irregular, raised, pigmented, papillated area of nævus verrucosus unilateralis involving the left auricle and extending into the external auditory meatus. On the left side of the scalp was a large area of alopecia, from which was removed a swelling the size of a gooseberry (present at birth) when the child was three weeks old. The child was born with all these abnormalities.

(6) *Tuberculous Ulcer of the Palpebral Conjunctiva in a Child, aged 15 months.*—Mr. Sydney Stephenson. The left lower lid of the little girl was thickened in its outer half, and the free edge of lid notched and eroded, the loss of substance being continuous with an ulcer of the palpebral conjunctiva. The ulcer, whose floor was nodular, was bounded posteriorly by reddish granulations, and

scrapings taken from it showed many bacilli occurring singly in places, not grouped together, moniliform ; some were curved.

The patient was very thin at birth, but since had gained flesh. The left eye had always been red and inflamed-looking, always discharging, the edge of the lid notched. No distinct evidence of systemic tuberculosis, occasional cough but no dulness in the chest. On the mother's side a fairly clear family history of tubercle was elicited.

(7) *Four Cases of Early Infantile Tabes, due to Congenital Syphilis.*—Mr. Brooksbank James.

Case 1.—A girl, aged 20, with paralysis of the left external rectus. Pupils unequal, the right being the larger ; they reacted to accommodation, but not to light. Knee reflexes absent ; anæsthesia of the lower extremities ; Romberg's sign well marked. She had had shooting pains in the dorsal region. There was also some retraction of the upper lid. The thyroid was slightly, but uniformly, enlarged. Pulse 80, Vision, R = $\frac{6}{9}$; L = $\frac{6}{18}$.

Case 2.—A boy, aged 17, showed gross central choroidal and retinal changes in the right fundus. The facial aspect of this patient was that of the congenital syphilitic ; depressed nasal bridge, pegged teeth, and scarring at the angles of the mouth.

Case 3.—A girl, aged 15. The pupils were unequal, very inactive to light, but reacting to accommodation. Knee reflexes sluggish. Depressed nasal bridge, and suspicious teeth.

Case 4.—A girl, aged 8. Pupils reacted to accommodation, but not to light. Depressed nasal bridge, and suspicious teeth.

(8) *Occlusion (Congenital?) of the Four Puncta Lachrymalia.* —Mr. Brooksbank James. The site of the upper and lower puncta in the right eyelids could be made out, but there was no passage. The site of the upper punctum in the left eyelid was doubtful, but that of the lower lid was present, and the passage had been opened. There was a slight conjunctivitis. A history was given of epiphora since birth. This patient's sister was also at the present time under treatment for lachrymal obstruction which was most probably congenital in origin.

(9) *Unusual Choroido-retinal Changes in Hereditary Syphilis.* —Mr. J. B. Lawford. In the right eye all round the periphery of the fundus were seen well-marked choroidal-retinal changes of the disseminated choroiditis type, but without much pigment. The whole of the central part was occupied by whitish tissue surrounding the optic disc and covering the macular region. The surface of this tissue blurred and raised the retinal vessels running over

it. The edges of the area were badly defined, with marked irregularity of pigmentation and atrophy of the choroid. No hæmorrhages were visible, but some pigment deposits were seen in the overlying retina. The optic disc had a dull, muddy look, and in level was markedly below that of the surrounding tissue. The vision in this eye was *nil*; not even perception of light. The left eye was quite normal. The changes in the right fundus was supposed to be due to choroidal inflammation resulting in the development of a thick layer of new tissue between the choroid and retina. The patient, a girl, aged 8, was the eleventh child out of a family of twelve, of whom four only are living; the tenth pregnancy resulted in a miscarriage. There were no marked or characteristic signs of syphilis, except that the child was delicate and had enlarged cervical glands.

(10) *Localised Fundus Change* (*Traumatic?*).—Mr. G. W. Roll. This patient, a man, was striking a steel tool with a hammer, in May last, when a piece of steel flew up into his right eye; directly thereafter his sight became darkened, but it gradually improved. In the right fundus, above and outwards from the macula, was a slightly raised oval white patch, with its outer edge deeply pigmented; below this a trace of hæmorrhage was visible, and lower still some choroidal disturbance. The vision in this eye $= \frac{6}{9}$ and J. 1. On the lower outer part of the cornea was seen a nebula, and a black patch on the posterior surface of the lens, also down and outwards. At the bottom of the patch in the fundus the shining sclerotic was seen and at one part it appeared as though it had been broken through. A chain of vitreous opacities fixed at one end to the patch was also seen.

During the discussion which followed, Mr. Mackenzie Davidson stated he had taken a skiagraph of the eye, which indicated clearly the presence of a foreign body, almost certainly steel, 3 mm. in length. He thought its position corresponded with the patch in the fundus, and that the foreign body was embedded in the sclera or lying in close contact with it.

Mr. Doyne pointed out the presence of the black patch on the posterior surface of the lens, and thought the piece of steel had passed through the lens.

Mr. Ormond stated he had seen a very similar case only a few weeks previously at Guy's Hospital, but in this case a hole was found in the iris; the foreign body occupied much the same position as in the present case, and was still in the eye. Ten days after the injury the wound had completely closed and he thought that in three months time, as in Mr. Roll's case, nothing would be visible to mark the point of entry.

Mr. Lang had seen a similar case in which the foreign body had passed through iris and lens.

(11) *Mooren's Ulcer of the Cornea.*—Mr. J. Herbert Fisher. The patient, a woman, aged 40, in a poor state of health, was affected in both eyes. She was first seen in September, 1900, and then had a faint nebula on the left cornea and a small ulcer in the right, both in much the same position. At the present time in the left eye, down and in, was a large ulcerated surface surrounded by opaque cornea. The ulceration itself had fine, overhanging margins which could be lifted up on the point of a probe. The whole of the ulcer stained with fluorescine. She had much pain from the ulcer in the right eye, which, after being treated with milder remedies, was finally well scraped and cauterised; this caused considerable pain immediately afterwards, but great relief after the lapse of a few days. Directly after the cauterisation a few radiating lines of striped keratitis were seen beyond the groove made by the cautery. Early in December the right ulcer no longer stained with fluorescine, and the eye had been quite comfortable. The ulcer in left eye appears to be slowly progressing round the margin of the cornea; so far this had only been treated with mild remedies, since it had shown no tendency to spread towards the centre. The most noteworthy point in the case was its extreme chronicity.

(12) *Choroiditis of Unusual Type.*—Mr. L. Vernon Cargill. In this patient, a female, aged 22, the fundus in each eye was stippled and showed numerous small spots of a greyish-red or yellow colour, which coalesced and formed chains. Some of these had pigmented borders, but not all; below each macular region was a large group of these patches; there were no vitreous opacities, and the retinal vessels passed in front of the spots. The discs were normal; venous pulsation was marked. The patient stated that she saw better in a dim light. Vision, right and left, $\frac{6}{60}$, and J. 12 and 8. The fields of vision were slightly contracted, with a central scotoma for white and colours. There was no specific history, and no renal trouble, the urine being normal. The patient has only complained of defective vision comparatively lately.

(13) *Small Eye with Ciliary Processes Adherent to the Anterior Surface of Shrunken Cataractous Lens (Congenital).* — Mr. N. Bishop Harman. The right eye was smaller than the left, and showed an internal strabismus; both eyes had lateral nystagmus and slight epicanthus. The right pupil reacted to light slightly

but symmetrically. The vision in the right eye was *nil*, not even p. l. ; there was no red reflex. The left vision was $\frac{6}{60}$, and with correcting glass for myopic astigmatism, $\frac{6}{18}$. The right lens was deeply set and opaque ; below were several pigment spots ; the surface of the lens was wrinkled and looked like mother-of-pearl ; in the lower and the inner upper quadrant were visible some forty-five regular processes, deeply pigmented, and attached to the lens. The iris was quite normal, and not adherent to the processes.

Mr. Harman thought these cases were due to persistent hyaloid artery, together with abnormal development of fibrous tissue behind the lens, causing it to be retarded in growth and also retracted. He mentioned cases reported by Hess and Collins, and that the latter considered that the elongation of the ciliary processes was caused by undue persistence of the developmental apposition of the ciliary body to the lens.

(14) *Peculiar Form of Deposit on Descemet's Membrane.*—Mr. Marcus Gunn. On Descemet's membrane in one eye of a patient there appeared to be a group of globules strung together, somewhat flask-shaped, and joined by narrow connecting lines. Against the dark pupil they appeared opaque, of a dense white. There was no deposit of the usual form to be seen.

(15) *A New Refractometer.*—Mr. N. Bishop Harman. This consisted of two circular vulcanite discs, in which were placed plus and minus glasses respectively, but only whole dioptres ; to obtain the fractions the patient held a long strip of vulcanite with half and quarter dioptres set in it, so that by moving the strip up or down the exact correction could be obtained. The frame holding the discs being reversible, either the plus or the minus disc could be used as required. To obtain the higher numbers, a suitable lens above plus or minus 7 could be inserted in front of the sight-hole in the disc, and the disc turned round till the required number of dioptres was reached. The advantages claimed for the instrument were that it was extremely light (only 2 oz.) and very portable, its size being 7 inches by 3 by ½, and very inexpensive.

CLINICAL NOTES.

Detachment of the Retina.—Sinclair gives an account of certain interesting experiments performed by him with the object of investigating the mechanism of detachment and of devising some method of treatment less unsatisfactory than those at present in use. He injected copper filings into the vitreous humour; he induced large hæmorrhage into the fundus; he injected salt solution behind the retina; he picked up vitreous in the syringe and injected it behind the retina; he injected glucose solution and blood plasma. Having by one or other of these means established detachment, he next endeavoured to cure it by replacing the post-retinal fluid with active fibrinogen obtained from the blood of the horse. The intention in this procedure was to form a clot whose contraction and organisation would fix the retina in position. It seems that the power of absorption by the choroid is extremely feeble, and that salt solution injected post-retinally took a long time to disappear, the glucose solution was absorbed more rapidly, however. The albuminous (blood plasma) solution injected behind the retina not only took a long time to absorb, but caused increase of the detachment, probably by transudation from the vitreous. The post-retinal fluid in cases of detachment appears to be always much richer in proteids than is the fluid in the normal lymph channels, and even than the serous exudation of inflamed tissues, for which reason, among others, Sinclair declares himself more in favour of the Raehlmann (choroidal effusion *plus* diffusion) theory than of the Leber-Nordensohn; in regard to hopeful treatment his experiments were not altogether encouraging.—*Journal of Pathology and Bacteriology*, June, 1901.

Operative Treatment of Corneal Astigmatism.—Breuer again brings forward the suggestion that in certain cases of astigmatism of corneal origin permanent relief may be afforded by means of operation. The method which he adopts is to cauterise with a loop of fine platinum wire, kept at a dull red heat, and with this he makes a small punctiform burn in the limbus or in the cornea, the depth being about half the thickness of the cornea. This may be done at one or both extremities of the most hypermetropic meridian, and though the effect is in some cases quite temporary, in others the refraction in the meridian attached has remained permanently less hypermetropic or more myopic. As he makes it a rule to confine this treatment to patients in whom there is strong desire to dispense with wearing a glass subsequently, and some prospect of accomplishing this object, it is chiefly among hypermetropic and mixed astigmatism cases that he finds suitable persons. In the suitable cases, however, he has been pleased with the (apparently) permanent benefit obtained.—*Lancet*, June 1, 1901.

MOOREN'S ULCER OF CORNEA—A CORRECTION.

To the Editor.

Sir,—I shall be glad if you will allow me to correct in your next issue a small part of the report of my paper on "Mooren's ulcer of the cornea" at p. 359 (December, 1901). I am there said to hold the opinion that Fuchs' catarrhal ulcer, his keratitis marginalis of two varieties, his marginal corneal atrophy, and Schmidt-Rimpler's peripheral furrow keratitis, "are all Mooren's disease."

What I did say, after describing the five conditions above mentioned, was: "Speaking for myself, I am familiar with some of these conditions but not with all. Perhaps further study will result in a simplification of this rather bewildering group, and also show that (as a case by Frank indicates) true ulcus rodens may sometimes develop from what seemed at first to be something much less serious."

Yours faithfully,

E. Nettleship.

THE REQUIREMENTS OF A TEST FOR COLOUR-BLINDNESS.

By F. W. Edridge-Green, M.D., F.R.C.S.

A test for colour-blindness must be based upon the *facts* of colour-blindness and not upon any theory which is inconsistent with those facts. Nearly all the tests in use at the present time have been based upon Helmholtz's original explanation of colour-blindness, but examples which I have recorded show that this explanation cannot possibly meet all cases. A man may be able to see all colours at twice the normal distance and yet be colour-blind. My primary objection to the Young-Helmholtz theory was that if one set of fibres, responding variably to rays of light of different degrees of refrangibility, were removed, it ought to follow that the perception of light and shade of a colour-blind person should differ from the normal in a corresponding degree. But there are many colour-blind persons who have exactly the same perception of light and shade as the normal sighted, and therefore the hypothesis cannot be true. This was recognised by Helmholtz and stated by him in the second edition of his *Handbuch der physiologischen Optik*, issued in 1892. He says, p. 364 :—" Aber es ist hierbei nicht ausgeschlossen, dass diese fehlende Farbe auch dem normalen Auge fehlen könnte, und das Gewicht Null hätte. Das würde heissen, dass zwei der Grundempfindungen des normalen Auges dem Farbenblinden durch alle Reizmittel gleich stark erregt

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wurden. In der That ist es neuerdings wahrscheinlich geworden, dass in dieser Richtung die Lösung des Räthsels zu suchen ist. Die älteren Erklärungsversuche der Farbenblindheit gingen von der erstgenannten Annahme aus, dass den dichromatischen Augen eine der Grundempfindungen fehlte. Ich habe dies in der ersten Auflage dieses Handbuchs selbst angenommen."

In spite of these remarks by Helmholtz, it is extraordinary that the old explanation of colour-blindness has been adhered to by the physicists in this country to their own discredit. As Helmholtz has written in connection with this subject, "Actual doubt is far better than dogmatic ignorance." Dogmatic ignorance is a condition of mind which is far from uncommon amongst many so-called scientific men. I have given Helmholtz's later opinion not with the idea of advocating the solution there given, but simply with the object of showing that he no longer adhered to the explanation which is current in the text-books. The new view is opposed to many facts, and, as I have elsewhere pointed out, there is not one single fact to show that there are any special fibres or substances in the retina corresponding to definite colour sensations, and all the facts of colour vision can be explained much more efficiently by another hypothesis.

It is not my intention to criticise the Holmgren test in detail, as most are aware of its defects. No less than six varieties of colour-blindness may escape detection by this test, and a very large percentage of normal-sighted persons are rejected by it: of those who appealed from the decision of the Board of Trade, no less than 38 per cent. in one year and 42 per cent. in another were found to have been rejected wrongly.

The first requirement of a test for colour-blindness is that colour names be used, and that the person to be examined should employ and understand the use of the colour names, red, yellow, green, and blue. I can say in the most emphatic manner that no test which ignores colour names can be efficient. I predicted that if colour names were ignored in the Board of Trade tests, normal-sighted persons would be rejected, and this prediction was fulfilled. Nothing shows the value of colour names better than an examination with my lantern of an educated colour-blind man who has just passed Holmgren's test with the greatest ease. He calls red, "green"; and green, "red"; he applies either term to yellow, thus not only proving his colour-blindness, but showing how absolutely unfit he is to act as an engine-driver or a look-out. It also proves to the colour-blind person himself that he is colour-blind, because he can be allowed to take out the red glass which he has called green and examine it. I have examined many persons who would not believe that they were colour-blind, and have remarked their horror when the conviction that they were so became forced upon them. An engine driver or sailor has to name a coloured light when he sees it, not to match it. He has to say to himself, "This is a red light, therefore there is danger," and this is practically the same as if he had made the observation out loud.

In order to show how normal-sighted persons are rejected by ignoring colour names, I will relate the following case. A man was sent to me as colour-blind. On examining him I found that he was normal sighted. I then examined him with Holmgren's test, carefully adhering to the directions. He put several confusion colours with the test green, but no greens. In answer to my enquiry he said that they were all of the same colour. I then said, "Are they all greens?" He replied, "No; they are not. That is a purple brown, that is a grey, and that is a yellow. You did not tell me to put only greens with the wool you gave me ; you said, ‘Pick out all of the same shade or colour.’ ” Several artists have remarked to me that they pay far more attention to shade than to colour, and that the confusion colours were more like the test green than those which are supposed to be picked out by normal-sighted persons. A very simple illustration may serve to make my point quite clear. Let it be supposed that I wish a man or a child to separate a roomful of people into men and women. I take him to the room and say, “Now I want you to separate these persons. I want you to put all who look alike in one class, and the remainder in another.” When I return I find that he has put all the big people in one class and all the small people in the other. If I then say, “You have classified them wrongly. I wanted you to put the men in one class and the women in the other,” he could reply, “Then why did you not tell me that you wanted me to separate them into men and women ?”

It must not be supposed that I advocate a method of testing by simply asking the examinee to name a few coloured objects. To test a colour-blind person is an exceedingly difficult matter, requiring attention to dozens of practical details. The tests I use are two in number. One I have called the Classification Test and the other the Lantern Test, but before describing them I wish to say a word as to the groups into which colour-blind persons may be separated.

The colour-blind may be divided into two classes :—

(1) Those who, whilst having a spectrum of the normal length, have a diminished number of units ; that is to say, who see five, four, three, two or one colour instead of the normal six.

(2) Those who, with or without the normal number of units, have a spectrum shortened at one or both ends.

From a practical point of view we wish to devise a test which will show whether the examinee will be able to distinguish between the standard red, green, and white lights under the conditions in which he is likely to be placed. We do not wish to exclude the five- or four-unit colour-blind, or persons who have the violet end of the spectrum shortened, or the red end only to a slight degree. These persons are able to distinguish between the coloured lights as easily as a normal-sighted person can, and therefore, though scientifically they are of great interest, for all practical purposes they are normal sighted. We wish to exclude from the marine and railway services all those individuals who belong to the following three classes :—

(1) Those who possess a psycho-physical colour perception with three units or fewer than three.

(2) Those who, whilst being able to perceive a greater number of units than three, have the red end of the spectrum shortened to a degree incompatible with recognition of a red light at a moderate distance.

(3) Those who are affected with central scotoma for red or green.

I will now explain why these three classes of persons should be excluded.

The first class includes the three-unit, the two-unit and the one-unit, in accordance with my examinations of the colour-blind with the spectrum. The three-unit, instead of seeing six colours in the spectrum see only three, the two-unit two, and the one-unit one. The three-unit never, under ordinary circumstances, mistake green for red, but confuse yellow with red and green ; they regard yellow as red-green, and blue as violet-green.

The two-unit regard green and red as almost but not quite identical, and this fact is one which it is nearly impossible to make persons who have not thoroughly studied colour-blindness comprehend, either the colour-blind person himself, the public, or an unqualified examiner. These find that many colour-blind are able to recognise different colours and name them correctly, and therefore set down the mistakes made to want of education in colours. We cannot wonder at these comments, considering that the large majority of recorded cases have been of school children and uneducated persons. This source of error I eliminated by using for my standard cases only educated adults who had tried to train their colour sense, and were well aware of the names of colours. The following will show how it is that the colour-blind are able, under ordinary circumstances, to distinguish between the colours included in one of their units. All colours have not a similar degree of luminosity; thus yellow is much the brightest colour. To the two-unit colour-blind, red, yellow and green have, as far as colour is concerned, a very similar appearance. They are not exactly alike in colour because they are included in an approximate, not in an absolute, psycho-physical unit. Green looks a lighter and greyer colour than red. A normal-sighted person might be given a bundle of wools, consisting of three kinds, the first, pure greens, the second, bluish greens, the third, pure blues. He would be able to arrange these in three groups with few mistakes.

It is very important that persons belonging to the second class should be excluded, and yet none of the ordinarily used tests detect them. The rays of red at the extreme left of the spectrum are the most penetrating, as may be seen by looking at a light or the sun on a foggy day, or through several thicknesses of neutral glass. It is chiefly by these rays that we recognise a red light at a distance, and it is therefore of great importance that a sailor or engineer should be able to perceive them.

In the third class the condition is one in which a person might be able to distinguish colours easily when they are close to him, but fail to distinguish them at a distance, owing to the nerve fibres supplying the central portion of his retina being impaired. As a light at a distance occupies the central portion of the visual field, it is essential that the corresponding portion of the retina should be normal.

We also do not wish to exclude persons who, though partially colour-blind, have a colour perception sufficient for all practical purposes.

To turn now to the actual test to be employed :— If the persons to be tested have to distinguish between the standard red, green and white lights, these lights should be used as the basis of the test, because if any other test were used we should still have the same problem before us from a practical point of view. A sailor might (with reason) object to any other test, and say that because he cannot distinguish between a green and a grey wool it is no reason why he should be unable to distinguish between the red and green lights.

Lantern Test.– By using a lantern with slides containing standard red and green glass, we can obtain the necessary colours. But there are few colour-blind who cannot distinguish between the red and blue-green lights at a short distance. A simile will show how they are able to do this. If a normal-sighted person were to take two coloured glasses, green and blue-green, and place them in the lantern, at a short distance, he would be easily able to distinguish between them. He would see as much difference between them as the colour-blind (two-unit) do between the standard red and green. But as the distance became greater he would find more and more difficulty in distinguishing between them, and it would be very unsafe to trust a ship or a train to his powers, especially when one light only was shown. The two-unit colour-blind find the same difficulty with the standard red and green. The intensity and character of the light should therefore be changed without the knowledge of the candidate. This may be done effectually with certain kinds of neutral glass.

The glasses I use, like a mist or fog, are most transparent to the red rays at the extreme left of the spectrum, and when several such glasses are used together the light allowed to pass through them has a distinctly reddish hue. The normal-sighted easily recognise coloured lights which have had their intensity diminished by neutral glass, but the colour-blind find great difficulty in distinguishing the colours under these circumstances.

The apparatus of the test, therefore, consists of a lantern, slides containing glasses of the standard red and green, pure green, blue, purple, and yellow, four slides containing neutral glass of the requisite character, of different degrees of thickness, one slide containing ground white glass and another containing ribbed white glass. The pure green, purple, blue and yellow slides are necessary to prevent guessing on the part of the candidate. The testing should be done in a dark room, the examinee being seated opposite the lantern and at a distance of at least fifteen feet from it.

The examiner should on no account conduct the examination on any regular plan, because the candidate, anxious to pass, might find out the order and method of the examination from persons who have already passed, and so, though colour-blind, might obtain a certificate. Any one of the slides may be first shown, and the candidate required to name the colour of the light.

The following will serve as an example of the method to be employed in testing a candidate. The standard red slide being placed in the lantern, the candidate is required to name its colour. Then a blue or a green slide may be substituted. Then one of the neutral, ground or ribbed glass slides should be inserted, not the slightest intimation being given to the candidate of the nature of the slide. He should be asked to name or describe the light, and the answer, if incorrect, together with his other replies, carefully recorded. The other slides may then be shown, a combination of the neutral, ground, ribbed and coloured glasses being used at irregular intervals. Care must be taken when the candidate is going to be examined with two slides at once, such as one of the neutral, ground, or ribbed glasses and a coloured glass, that he does not see the light until both slides have been inserted, or else he may see the colour before it is modified in the necessary way.

Another practical point to be borne in mind is that the modifying glass should be placed in *front* of the coloured glass and not between it and the light, just as the fog or mist is in front of the signal glass and not behind it.

If the candidate call the standard red "green," or the standard green "red," under any circumstances, that is, either alone or in combination with the modifying glasses, he is to be rejected.

The examination may cease when a candidate has mistaken green for red, or *vice versâ*. He may be convinced of his incapacity by seeing, close to him and unmodified, the colour which he has mistaken.

Particular attention should be paid to the answers given to the combination of the thickest neutral glass with the standard red and green respectively. This glass is of such a thickness that it obstructs all light with the exception of a band of red at the extreme left of the spectrum, and a band of green. When used in combination with the standard red, it gives a red light visible to the normal-sighted at a considerable distance. With the colour-blind, if the red end of the spectrum be much shortened, the red light will not be perceived at all. The glass in combination with the standard green gives a dull green light which is easily recognised by the normal sighted.

It will be noticed that with this glass the relative intensity and character of the red and green lights are changed. With the unmodified lights the green is lighter and bluer than the red. When modified with this neutral glass the green appears the darker and yellower of the two, exactly as it does in a mist or fog. The two-unit colour-blind, therefore, at once call this combination red, because the colour is made to look so much like their red. I have not met with a two-unit colour-blind who has named this combination correctly; the answer has invariably been "red," usually with some positive exclamation, as, "There is no doubt about that being red" or "black." The importance of this fact cannot be over-estimated, because I have tested educated colour-blind persons who have found no difficulty in naming the colours when unmodified with neutral glasses—and so would have obtained a certificate. These would be most dangerous persons at sea, because they would deliberately mistake the red light for the green and *vice versâ*. At the same time they would feel positive about the nature of the lights. It seems to me that in all probability this is how many accidents have occurred.

If the candidate call the white light, under any circumstances, "red" or "green," or *vice versâ*, he is to be rejected. Also if he call the red, green, or white light "black," under any circumstances.

As it is the confusion of red, green and white which forms ground for rejection, in examining with the neutral glasses the examiner should be guided by this point. A neutral glass may give a reddish tinge to the light; a candidate calling the light "red" might be reconsidered, whilst a candidate calling the light "green" should be rejected without further consideration.

One incorrect answer (embodying one of the mistakes mentioned above) suffices for rejection. It is important to strictly adhere to this. A normal-sighted person would not mistake the colours confused by the colour-blind. Colour ignorance is quite as fatal (if the mistake were due to this cause) as colour-blindness; thus if a sailor on seeing a red light *thought* it was a green one, and steered as directed for a green light, he would cause an accident just as surely as if he were colour-blind.

A candidate who has made one mistake only may be passed on to a specialist, but should never be passed by an examiner not thoroughly acquainted with all the theoretical and practical details of colour-blindness. An examiner should as far as possible avoid all conversation with the candidate, simply asking, "What colour is this?" and recording the answer without comment. If an examiner after each answer say "Quite right," or some such expression, the following is likely to occur. The candidate, after say six correct answers, makes a mistake; the examiner says "Are you sure?" Then the candidate knows at once that he has made a mistake and makes a guess, very probably a correct one. When a similar colour is shown subsequently he remembers the mistake he made, and gives the second and probably the correct answer. Mistakes other than those mentioned above simply demand a very searching examination.

On re-considering this test I do not find that it is open to any objection. The material is the best possible, as it will not fade like all dyed substances, and therefore all records made with one set of apparatus will be uniform. Again, a coloured light has none of the accessory qualities which enable the colour-blind to pass through other tests. Thus many two-unit colour-blind will call the yellow glass "red" or "green," who would not think of putting a yellow with a green or red wool, on account of the difference in luminosity. The test is not open to any of the objections which may be urged against the method of simply naming colours, because the character and intensity of the colour may be changed at will. No amount of coaching will enable a colour-blind to pass this test, whilst almost any other may be passed in this way.

The test also has a quality possessed by no other, namely, that of enabling the examiner to reject dangerous persons, and dangerous persons only, the lower degrees of colour-blindness being allowed to pass.

Classification Test.—I have also devised what I have named a "Classification Test for Colour-Blindness." The test colours are, Orange, Violet, Red, and Blue-green. These are labelled I., II., III. and IV. respectively. The box contains a series of colours chosen by me, and are those which are especially confounded with the test colours—150 wools, 10 skeins of silk, 10 pieces of coloured cardboard, and 10 pieces of coloured glass. The Lantern Test is a necessity, and the Classification Test cannot be substituted for it. It will be found advantageous to have the latter test for use in cases in which the examiner finds difficulty in making up his mind as to the rejection of a candidate. The use of this test will also enable the examiner to become familiar with the mistakes made by the colour-blind.

I have in this article only mentioned the main points of a test; further details will be found in my book on "Colour-Blindness" in the "International Scientific Series."

REVIEWS.

G. SOURDILLE (Nantes). The Pathology of Lesions of the Optic Nerve in Cerebral Tumour. *Archives d'Ophtalmologie, July and August,* 1901.

This contribution is based upon the observation of three cases, two of cerebral tumour and one of hæmorrhagic pachymeningitis, in all of which the condition was verified at autopsy, and careful examination of the optic nervous apparatus was carried out. Anatomical details were revealed on which the author thinks sufficient stress has not up to the present been laid; and when compared with numerous cases which have been already published, they appear to throw some light on the pathogenesis of the papillitis which accompanies cerebral tumour.

The three cases are described clinically, anatomically, and pathologically, in minute detail, and illustrations of microscopical sections are given by the author. In one case the very commencement of the changes could be examined, for there was œdema of the neuroglia of that part of the nerve, and of that part alone, nearest to the brain, and which did not extend as far as the papilla. In spite of rapid evolution of the cerebral affection, the portion in the region of the optic foramen already showed marked atrophic lesions which were not present elsewhere. In another case the affection of the nerve was more pronounced; it was swollen throughout its whole extent and its sheaths were considerably distended. The œdema was general, and permeated the neuroglial network, and the nerve degeneration was well marked, for, though it reached its maximum at the level of the optic foramen, it extended both forwards and backwards, and the papilla was very much swollen.

In the third case the lesions were still more advanced. Œdema of the neuroglia was well marked both in the immediately retrobulbar and orbital portions of the nerve, but the more predominant feature was a general atrophy, which was most pronounced at the level of the optic foramen.

The author points out that the important fact revealed by these observations is that the pathological changes are most pronounced at the level of the optic foramen, and that the initial change is an œdema of the neuroglia. Cellular infiltration and sclerosis do not appear until later, and are accompaniments of atrophic changes. In the cases where the papilla was considerably swollen the central vein was closely compressed, not at the level of the lamina cribrosa, but most markedly 5 or 6 mm. behind the sclerotic, and only for a short distance.

Among the numerous theories which have been put forward to explain optic nerve lesions in the evolution of cerebral tumours, several have an interest which is even already only historical, such as that of compression of the cavernous sinus which was advanced by Graefe, and that of reflex action by Benedict and Hughlings Jackson. The three theories which at the present time share the favour of clinicians are those of Schmidt-Rimpler and Manz, Leber and Deutschmann, and Parinaud.

(1) The theory of Schmidt-Rimpler and Manz maintains that the presence of a cerebral tumour causes an increase of intracranial pressure, thereby leading to the cerebrospinal fluid being forced into the inter-sheath space of the optic nerve. First there is a dropsy of the sheath; the fluid then filters through the pial sheath, giving rise to œdema of the optic nerve and papilla, and to obstruction to the circulation. If the increased intracranial pressure were really the cause of the papillitis, there should be a fairly exact relation between the intensities of the one and of the other, that is to say, the papillitis should be accentuated by an increase in intracranial pressure. This is not the case as a clinical fact, for, as Gowers has pointed out, in cases of hydrocephalus, where the intracranial pressure reaches its highest, optic neuritis is rare, and when it occurs is never intense; whilst on the other hand, neuritis often accompanies tumours of very small size, and may even occur

independently of any tumour, in meningitis for example, which does not increase the intracranial pressure to any marked degree. Another objection which has never been met is that papillitis, which is often the first symptom in cerebral tumours, develops before the intracranial pressure can be appreciably raised, and then as the pressure increases, papillitis and dilatation of the sheaths may diminish, and even atrophy ensue. Further, experimental increase of intracranial pressure is incapable of producing lesions of the papilla analogous to those seen clinically with the ophthalmoscope. The relief or cure of optic neuritis which has undoubtedly followed trephining may be compared as analogous in mechanism, be it vasomotor or what not, to the good effect of opening the abdomen, with or without washing out the peritoneal cavity, in tubercular peritonitis; and the explanation is certainly less simple than the defenders of the Schmidt-Rimpler-Manz theory are willing to admit.

(2) The theory of Leber and Deutschmann is to the effect that the irritating action of phlogogenic products secreted by the tumour and brought into contact with the nerve and its sheaths by the cerebrospinal fluid, causes an infiltration of leucocytes, and a perineuritis and neuritis, extending from the chiasma to the globe. This theory of infection is founded on clinical, anatomical, and experimental evidence. The chief clinical evidence is that there is not any essential difference between "choked disc" and descending neuritis; the two types may occur in the same patient or even in the same eye successively. According to Leber, Deutschmann, Elschnig, and Baas, the infiltration of round cells is anatomically the fundamental lesions, and infection can alone explain it. On the other hand, according to the observations of Ulrich, Iwanoff, Otto Becker, Parinaud, the author, and others, the initial dominating lesion is an œdema which has no relationship with the cerebrospinal fluid. If cellular proliferation exists, it is only an accessory phenomenon, playing merely a secondary part in the process, and is more accentuated in proportion as degeneration is more

marked. The neuroglia has a relationship to the nerve fibres of the optic nerve comparable to that of the sheath of Schwann to the fibres of the ordinary or spinal nerves. If a ligature is placed on a nerve not only is there degeneration of the axis cylinders and myeline below, but also a cellular infiltration of the perifascicular tissue. There is no question of infection in this case. The degeneration produces waste products which must be eliminated, and the agents of elimination are the phagocytes or white cells. Elschnig, although he has employed numerous staining reagents, has never been able to discover microbes in the optic nerves which he has examined. Moreover, whilst general microbic cerebral affections (cerebral abscess, diplococcary meningitis, &c.) may not be accompanied by optic nerve lesions, tumours which are certainly not infective (hæmatoma, glioma) almost constantly produce them. Are the toxines, which are said to be produced in the cases of cerebral tumour, sufficient to infect the whole cerebrospinal fluid and cause optic neuritis in this way? and if so, why do not malignant intraocular tumours produce reactionary inflammation by saturating the intraocular fluid?

(3) The theory of Parinaud was founded on the coincidence of internal or ventricular hydrocephalus and papillitis. The development of a tumour causes hypersecretion of cerebrospinal fluid and an accumulation under pressure in the ventricles, which interferes with the lymphatic circulation in the brain and, since the optic nerve is an elongation from, and is indeed part of, the brain, of the papilla, optic neuritis is produced by the œdema thus caused. The integrity of the nerve may be preserved for a time, but after a certain period it atrophies, and the atrophy is comparable to that which is seen in cases of old-standing œdema in cardiac and Bright's disease, and is due to the chronic inflammation caused by the prolonged sojourn of the fluid in the tissues.

The author admits the fundamental idea of this doctrine, viz., œdema of the optic nerve in association with cerebral œdema; but he believes that the mechanism of production is different. He points out that the chiasma is anatomically an appendage of the wall of the third ventricle, with which it is intimately incorporated. The whole of the perifascicular and intrafascicular neuroglia of the optic nerve is in direct continuity with that of the chiasma and ventricle, so that the least circulatory trouble or smallest lesion arising in the wall of the ventricle would immediately and directly react with an equal intensity on the chiasma itself and on the optic nerve. In the cases cited it is shown that œdema of the wall of the third ventricle leads first to œdema of the chiasma, which descends gradually down the optic nerves. The œdema spreads gradually in the neuroglia, causing a marked increase in the size of the optic nerves, but it would be of comparatively slight importance if the nerve had not to traverse the resisting optic canal, which only just suffices for the passage of the nerve, its sheaths and the ophthalmic artery. The motor and sensory functions of the nerves of the limbs are preserved for a very long time in spite of considerable œdema. But in the case of the optic nerve, if it increases in volume it is narrowly compressed in the optic foramen, and the strangulation can be easily demonstrated in fresh portions of an inflamed optic nerve from a case of cerebral tumour. The greatest strangulation is found, not in the course of the canal but at its posterior part, and is due to the effect of a small falciform process of dura mater which continues backwards the roof of the osseous canal. In consequence of this circular compression at the optic foramen, the blood return in the veins of the optic nerve which pass to the cranium is obstructed, as well as the lymphatic circulation, which gives rise to the photopsiæ experienced at this period. The interstitial œdema of the nerve is increased at the same time, and the veins of the pia mater are dilated and allow a serous transudation into the subarachnoid space. This liquid cannot flow backwards towards the brain because the swollen optic nerve completely fills the osseous canal and closes the return paths. The sheaths become distended, and the distension is greatest in the retrobulbar region, giving rise to the classical ampullary dilatation, the dural sheath being normally more distensible in that situation. The circulation in the central artery and vein is obstructed; but as the obstruction to the venous return is gradual, the capillary network of the lamina cribrosa, which places the vessels of the optic papilla in communication with those of the choroid and scleral ring, becomes dilated, so that the blood can return collaterally through them. Vision and retinal circulation are thus preserved, but the swelling of the papilla is a clinical expression of the collateral circulation of the lamina cribrosa which takes the place of that of the central vein. The amount of swelling of the papilla bears an inverse ratio to the degree of circulation in the central vein, and there is no essential difference between descending neuritis and "choked disc."

Briefly summed up, the following are the conclusions arrived at:—

(1) The theories of Schmidt-Rimpler and Manz, and of Leber and Deutschmann do not sufficiently explain the clinical and histological changes affecting the optic nerves in cases of intracranial tumour.

(2) The theory of cerebral œdema proposed by Parinaud agrees better with the observed facts.

(3) The initial lesion is an œdema of the neuroglia, propagated directly down from the third ventricle through the chiasma to the optic nerve. The swollen optic nerve is strangulated in the optic foramen, and there is in consequence venous stasis in the whole of the orbital portion of the nerve, with consecutive dropsy of the sheath; in this the pressure of the cerebrospinal fluid plays no part. The central artery and vein being compressed, a collateral circulation is established by means of the capillary network of the lamina cribrosa, in virtue of which the venous blood from the retina is diverted into the choroidal and scleral systems. This dilatation of the network of the lamina cribrosa is the chief cause of the swelling of the papilla. Atrophic changes start at the optic foramen, and are due to strangulation of the nerve in the osseous canal. The atrophy extends up to the chiasma and down the

orbital portion of the nerve, becoming, as the case goes on, complete and general. Thus œdema of the neuroglia, and resulting sclerosis from strangulation of the nerve in the osseous canal, appear to form the process which accounts best for the clinical and histological changes which characterise the development of lesions of the optic nerves in the evolution of cerebral tumours.

L. V. CARGILL.

SACHSALBER. Hyaline Degeneration of the Cornea. *Beiträge zur Augenheilkunde, Heft.* 48, 1901.

The paper opens with a detailed description of five eyeballs which were the seat of corneal staphyloma.

In some cases of staphyloma the epithelium is normal, but in others there is a disturbance of nutrition, as is shown by diminished power of taking on stains. A further stage in this degenerative process is disintegration of the cells into detritus, the nuclei resisting the change longer than the cell substance. Some eyes present a peculiar form of degeneration, evidenced by the down-growth of the superficial horny cells in branching processes, which form a network enclosing large and swollen cells. Such an appearance is found in most staphylomatous eyeballs to a greater or less extent, and is possibly a result of increase of tension. In advanced cases exfoliation takes place, and may extend to the deepest layers. The regular stratification is lost, owing to the presence of an intercellular concretion in the form of isolated hyaline globules, which may be of such dimensions that the surrounding cells are so flattened by compression as to form a kind of capsule, which sometimes bursts. Some of the compressed cells disintegrate, and it is possible they may be transformed into concretion.

A further kind of epithelial degeneration is determined by the ingrowth of connective-tissue processes, which force themselves into the epithelial layer. They begin as simple plugs, but later spread out laterally, and are surrounded more or less by cylindrical basal epithelial cells. Eventually a lenticular mass of epithelium is cut off from the general stratum, breaks down, and is absorbed, leaving a thin layer of superficial epithelium covering a thick prominence of scar tissue. The scar tissue undergoes degeneration into hyaline matter, which latter may in its turn undergo calcification. The calcareous mass often projects from the surface of the staphyloma, and may be rubbed off, with the result that a new scar forms, and the process is repeated.

In connection with the epithelial scars are found foci of softening, whose thin fluid contents usually become absorbed during life, or disappear in the processes of hardening and embedding. The resulting cavities, which are always under the epithelium, present at their borders numerous nuclear fragments and cell remains. The conditions determining on the one hand softening, and on the other calcification, are unknown. Cavities are also seen from which calcareous masses have fallen out during section.

The hyaline substance is formed exclusively in the scar tissue or corneal stroma, and only secondarily invades the epithelial layer through gaps in Bowman's membrane; this is probably never intact, but even if such were the case, the soft hyaline material could make its way through the lymph spaces. The hyaline globules have never been demonstrated within the epithelial cells, but always between them, and no remains of cells are ever found in the hyaline substance; these facts seem to prove conclusively its extra-cellular origin.

The degeneration is also found in both the superficial and the deeper layers of the scar tissue; globules of hyaline are scattered here and there; and in addition there may be a direct degeneration of the lamellæ, and a fine dust appears fairly uniformly distributed over the whole scar area. Sometimes a relatively large, irregular mass of scar tissue degenerates *en masse*. Lastly, a fibrillar and (at least apparently) elastic degeneration takes place in the periphery of the cornea, and in the stroma of the conjunctiva and sclera. The elastic fibres are wavy, and occur both singly and in bundles. These, which take on an intense colour with eosin, are found in cases of corneal degeneration of any standing; they grow in length and breadth, and present an irregular moniliform appearance. Eventually they disintegrate into dust-like and crumbly hyaline masses, a process similar to that which goes on in an ordinary pinguecula.

The hyaline concretions are insoluble in water, alcohol, ether, or dilute alkalies; concentrated acetic acid causes slight swelling. Hydrochloric acid causes no change, and no bubbles of gas are produced even in the calcified areas. This proves the absence of any carbonate, but calcium is certainly present in some combination, as is shown by the production of calcium oxalate crystals when specially treated with oxalic acid. With hæmatoxylin-eosin fresh concretions stain intensely red, older spots reddish-blue, and the oldest blue; where the blue colour is well marked calcium oxalate crystals can generally be found.

Weigert's fibrin colours fresh concretions blue and calcified portions red. The dust-like deposits stain usually like hyaline substance. Apparently the hyaline substance is apt to undergo calcification, but besides this secondary calcification there occurs sometimes a primary chalky infiltration. The corneal degenerations, which are designated as band keratitis, colloid, or scar degeneration, &c., constitute histologically one group, which includes all transition forms between pure hyaline degeneration on the one hand, and pure chalky degeneration on the other.

In the iris a deposition of hyaline concretion occurs also in the reticular and muscular layers. This deposit may undergo changes similar to those which prevail in the cornea.

J. Gray Clegg.

BYERS (Montreal). The Primary Intradural Tumours of the Optic Nerve (Fibromatosis Nervi Optici). *Studies from the Royal Victoria Hospital, Montreal, No.* 1.

In this paper, the first of a series of studies from the Royal Victoria Hospital, Montreal, the author gives a general account of primary intradural tumours of the optic nerve, based on an analysis of the reported cases, 102 in number, to which references are given. He adds a pathological description to the notes of a case reported by Dr. Buller in 1886, and relates the clinical history and pathological appearances of one which came under his own observation. The patient was a girl, aged 17, who had noticed loss of vision in the left eye at the age of 15; some months later proptosis occurred. At the date of examination there was proptosis, with impaired movement in all directions except downwards; the eye was blind and showed optic neuritis. The tumour was excised with preservation of the eyeball. There was a recurrence in the orbit in six months, and death resulted from intracranial growth about ten years later. Microscopically the intracranial tumour was a sarcoma, and contained numerous sand bodies (psammoma or endothelioma). Byers thinks that the original tumour was of a strictly benign type, and only after a lapse of years did the portion not removed take upon itself a malignant character.

Tumours of the optic nerve are among the rarities of eye surgery. The capsule of the tumour, which generally affects the posterior two-thirds of the nerve, is formed by the dural sheath, and the core of the enlargement by the nerve proper and its pia mater, while between these structures and the dural sheath, in the distended subdural space, a layer of cell overgrowth is present in every instance. In longitudinal section the following varieties may be noted :—

(1) The new tissue stratum, mostly developed over the central part of the optic nerve, ceases to exist at either end, while the nerve proper — normal or nearly so —

anteriorly and posteriorly expands considerably in the central region of the swelling.

(2) The optic nerve runs unchanged or uniformly enlarged through the whole course of the growth, which occupies as usual the subdural space in varying degree.

(3) The nerve proper gradually increases in size to the optic foramen; the subdural stratum on the other hand develops more as the globe is approached.

(4) The tumour stratum is developed along the whole or posterior part of the nerve, while the nerve proper, normal or nearly so for some distance, expands like a fan (as seen in section) and is lost in the growth.

(5) The nerve proper and subdural stratum, developed mostly anteriorly, become normal or nearly so at the optic foramen.

A study of the sections shows that in the great majority of instances the excised tumour is incomplete and must necessarily have been connected with a remaining portion situated within the cranium. The myxomatous appearance which is so marked in some cases of optic nerve tumour is not due to the presence of mucin, but to œdema brought about by lymphatic obstruction, and the essential condition in nearly all is a fibromatosis; the tumours have nearly all been mesoblastic in origin.

But there are a few cases which do not fall into this group, viz., those tumours which arise in a proliferation of the endothelial cells of the arachnoid, and which constitute endotheliomata. The primary growths of the optic nerve never give rise to secondary manifestations, though they may be locally malignant. When they cause death it is never (the author believes) because of the spreading backward of the orbital tumour, but through the continued growth of the intracranial portion of the neoplasm, which co-exists with the orbital tumour, and which is not removed at the time of operation.

The author then proceeds to discuss the questions of diagnosis and treatment, the important facts of which are more familiar.

W. Watson Griffin.

C. HESS (Würzburg). Entopical Observations on the Venæ Vorticosæ. *von Graefe's Archiv. für Ophtalmologie, liii.*, I.

Professor Hess has sought vainly in the literature of the subject for an explanation of the fact that during strong expiratory efforts (*e.g.*, sneezing) one can perceive more or less defined light sensations in the eye. The only reference which he has succeeded in discovering is to be found in a paper by Bell,[1] in which he states that such sensations are due to the contraction of the lids (which accompanies sneezing, for example) checking an impulse of blood driven towards the eye by the forcible expiratory effort. Bell, moreover, points out that if the lids are prevented from contracting on the globe during such efforts, the light sensations do not appear, and in addition, that if the eyes be touched with the fingers through the closed lids, or if the lids are energetically and suddenly shut in a dark room, the light sensations will appear.

Hess challenges these statements. He finds that if the position of the head be judiciously varied while the necessary experiments are being conducted the phenomena will appear after a much less violent expiratory effort than sneezing. If the head is kept in the usual erect position the expiratory effort must be a strong one, but if the head be lowered (as over the back of a chair) the expiratory effort need only be a slight one.

Examining his own eyes in a dark room, he found that the light sensations were more or less constant in position and form. Four bright spots appeared, generally united to each other by fine light rays, and approximately equally distant from the fixation point. Two of these were situated above and two below, each pair on one level, so that there was an upper and a lower external, and an upper and a lower internal bright spot in the visual field.

In all points the position of the "stars" agreed with that of the vortex veins with remarkable exactitude. There can be hardly any doubt that interference with the blood flow at the points of exit of the venæ vorticosæ on the internal surface of the sclerotic is capable of causing an excitation of the retina lying over them, and that the raising of the blood pressure in the cephalic veins by expiratory efforts can be propagated to the eye. With the ophthalmoscope one can see the swelling of the veins at the optic disc during a strong expiratory effort. Consequently all the factors would appear to be present to account for the more or less constant appearance of the four bright stars during a strong expiratory effort.

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[1] Second part of the paper on the Nerves of the Orbit, *Proc. Royal Society*, June 19, 1893.

Another explanation, Hess says, would not appear, *a priori*, to be excluded, namely, the sudden pushing forward of the globe by increase in the contents of the orbital blood-vessels during an expiratory effort, which Donders has shown to occur. It perhaps is conceivable that such a propulsion of the globe might, by the pressure of the recti upon it, cause these light sensations to occur in the tracts of retina lying between the four recti. However, Hess found that if he turned his gaze strongly to one side and at the same time passed a small glass rod behind the equator of his eye so as very gently to press the eye forward, while leaving the other orbital contents unaffected, this slight pressure was sufficient to prevent the appearance of the light sensations, showing that they could not be caused by the forward propulsion of the globe.

Finally, he concludes that the sudden raising of the blood pressure during an expiratory effort is sufficient to produce an excitation of the retina at the points of exit of the venæ vorticosæ, and that the usual light sensation so produced is in the form of four bright spots and is caused in this manner.

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FRENCH SOCIETY OF OPHTHALMOLOGY.

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Annales d Oculistique, November, 1901.

Congenital Coloboma of the Upper Eyelid.—M. Morax exhibited a female infant of two months with a congenital coloboma of the left upper eyelid, extending through the whole depth of the lid at the junction of the inner third with the outer two-thirds. The inner portion was very small, and the outer was drawn outwards and partly everted. A large part of the cornea was left exposed even on closure of the lids, and a dermoid was present at the lower outer side of the cornea. Morax had operated for the relief of the condition ; the first attempt was not successful, as is so apt to be the case in the presence of congenital malformations, but a subsequent attempt, of which a description is given, proved very satisfactory.

Ptosis.—M. Morax also related the case of a patient, a woman aged 26, who acquired a chancre of the conjunctiva of the upper lid. He placed her under anti-syphilitic treatment, but finding the process of cure too slow for her taste, she applied to another surgeon ; he diagnosed an abscess and incised it. The only effect of this action was to produce a traumatic ptosis. On her return to his care, Morax proceeded to operate for the relief of the ptosis by the method of Motais, which he modified slightly in two particulars. He passed the thread first through the middle portion of the tendon of the superior rectus and detached it by means of fine scissors ; and he carried the threads through to the skin surface before knotting them over a little roll of cotton, in order to avoid the grave inconvenience of applying the knots on the conjunctival surface. The effect of the operation was not at first so satisfactory as might have been desired, but it continued to improve, and eventually proved to be entirely successful. The degree of elevation of the lid amounted to 55°, instead of the 10° to 15° which alone could be produced before operation by the action of the occipito frontalis.

One interesting point in connection with the operation of Motais, as exemplified by this patient, was the following : It is well known that on voluntary closure of the lids the globe tends to turn upwards ; in the patient under consideration this movement was well seen, and when it took place at all vigorously, the lids could be observed to open to the extent of one or two millimetres. This is a matter to be borne in mind, and any removal of tissue from the lid must be very cautiously proceeded with in consequence of the risk of subsequent exposure of the cornea. Morax added that during the various excursions of the globe the anchoring of the lid to the superior rectus gave rise to no inconvenience whatever.

CLINICAL NOTES.

Asthenopia.—Lucien Howe (Buffalo, U.S.A.) concludes an article on this subject with the following paragraph: "It seems quite certain that a larger proportion of all the cases of asthenopia apply for relief in the United States than do so elsewhere, the reasons for this being the comparatively slight aversion of patients to the use of glasses, the fact that the average American ophthalmologist is better equipped than his foreign *confrères* for detecting errors of refraction and of muscular balance, that he takes pains to correct even small variations from the normal condition, and that the American optician has much more complete appliances for grinding glasses accurately and fitting them satisfactorily than has the average optician of any other country." He attributes the occurrence of asthenopia from slight errors, which is evidently much more frequent in the States than elsewhere, partly, also, to (1) carelessness in the use of the eyes: American journals are numerous, poorly printed and large, and Americans constantly read when travelling and at other unsuitable (?) times; (2) causes affecting the nervous system: chiefly the constant hurry and intense mental strain of modern American life; (3) causes affecting the digestive tract: Americans eat more meat, devour it more hastily, and drink an amount of fluid which may be insufficient, and which, certainly, is much less than that consumed in wine or beer-drinking countries. He seems to indicate also that the American will be satisfied with nothing less than perfect vision, and is therefore willing or even eager to wear glasses for the correction of even a trifling error rather than "sit down under" the very smallest disability. We are not sure that Dr. Howe has not omitted one or two other and more important reasons which might have been adduced to explain the extreme frequency of American glasses, and some of his "causes" read very like effects. No one is likely to complain of asthenopia *because* an optician can make neat glasses.—*American Journal of Ophthalmology*, August, 1901.

SPECTACLES FOR IRIDEREMIA.—In cases of coloboma of the iris, whether congenital or artificial, and still more in those of complete congenital absence of the iris, the patient is apt to be greatly distressed by the "blinding" effect of a sudden increase in the illumination, as, for example, when he steps from the house into broad daylight. In the spectacles suggested by Königshöfer, of Stuttgart, for the relief of this condition, the chief feature is the existence of an "iris diaphragm" precisely similar to that affixed to the better qualities of photographic lenses. A horizontal rod connects the controlling rods of the two eyes; when these two controlling rods point vertically upwards the "pupils" are medium in size. Should the patient enter a house or room he will desire a larger pupil, which he obtains by gently pushing the connecting rod which lies across the face just above the eyebrows a little to the right; both "pupils" then dilate equally. Should he enter a bright light he has only to push the bar slightly to the left, when the "pupils" at once contract. —*La Clinique Ophtalmologique*, Paris, October 10, 1901.

COCAINE.—Lazzaro and Traina, of Palermo, have carried out an investigation into the action of cocaine produced from coca leaves and the same substance manufactured synthetically. In regard to anæsthesia of the eye they found no evidence of inferiority on the part of the artificial products, indeed, in certain of their investigations it appeared to give more complete and more lasting anæsthesia. Chemically, they regard the two forms as exactly the same; in the higher animals the action of the two shows practically precisely the same effect, for any differences were so extremely slight as to prove no superiority of one kind over the other, while, tested in the human subject, their anæsthetic effects were indistinguishable.—*La Clinica Oculistica*, Palermo, June, 1901.

Sulphate of Copper.—Claiborne, of New York, is convinced of the great value of sulphate of copper, in the form of crystals, in a number of conditions for which it is not customarily employed by other surgeons. He advises its use in the following six conditions: (1) Acute attacks of inflammation of the cornea in which there is thickening, with a succulent, velvety appearance of the upper lid. (2) In all recurrent attacks of superficial keratitis in which the same condition of the upper lid prevails. (3) In infiltrations of the cornea which are the result of preceding inflammations, associated with the same condition of the upper lid. (4) In maculæ of the cornea in children and adults which have occurred (*sic*) a reasonable time after an inflammation, whether the upper lid presents a characteristic appearance or not. (5) In chronic conjunctivitis attended by thickening of the lid associated with blepharitis. (6) In chronic dacryocystitis (particularly in those cases in which the canaliculus has been slit) attended by chronic conjunctivitis. He acknowledges the fact that sulphate of copper is looked upon with much disfavour by many good authorities, but asserts that in a number of cases belonging to classes indicated he has obtained results much surpassing those obtained by other methods. He is specially particular to apply it thoroughly to the upper *cul-de-sac*, rather than to the lid proper.—*New York Medical Record*, July 27, 1901.

Indirect Rupture of the Eyeball.—A case of what must always be a very rare accident occurred during the Boer war, and is related by Cargill. A bullet from an unknown range passed somewhat obliquely to the plane of a soldier's face, grooving the right side of a prominent nose, and slightly the lower lid, just below the external canthus. There was a superficial ocular contusion corresponding to the lid injury, and a subconjunctival rupture of the globe on the opposite side, upwards and inwards, just outside the sclero-corneal junction, with escape of the lens and some of the iris through the rupture. The retina was completely detached, and there was an extensive sub-retinal and choroidal hæmorrhage, greatest on the side near which the bullet passed. The fellow eye escaped injury.—*British Medical Journal*, October 26, 1901.

SUBCONJUNCTIVAL INJECTIONS OF GELATINE. — The mode of treatment of aortic aneurism by injections of gelatine has apparently been so successful that de Wecker has thought it well to try whether a similar procedure would have a beneficial effect upon the eye. In detachment of the retina the subconjunctival injection of 10 or 20 per cent. solutions of sodium chloride has been found to cause so much pain that, though it is capable of doing much good, one shrinks from employing this method of treatment. He has tried subconjunctival injections of gelatine, either by itself or with chloride of sodium, in the proportion of 3 to 5 per cent., and found these to be practically painless, and at the same time to give very encouraging results. It is not only in detachment of retina, however, that such injections exercise a beneficial influence; in cases of hæmorrhage into the vitreus he has seen rapid and wonderfully complete absorption follow their employment. Of such an experience he gives a brief but interesting account, and advises the use of glycerine also in various forms of hæmorrhagic retinitis. The gelatine should be prepared from isinglass, should be of 2½ per cent. concentration, and should always be fresh, and undergo sterilisation immediately before use.—*La Clinique Ophtalmologique*, November 10, 1901.

ISOPTERS.

PROF. HIRSCHBERG writes to us that Mr. Coulter, in his paper on "Fields of Vision," in our January issue, is in error in attributing to Groenouw the first description of Isopters, or lines indicating the limits of the field of vision for objects of various sizes, and that it was he himself who first (1878) mapped them out. While not greatly interested in questions of priority, we insert this note, "without prejudice," at his special request.

THE VARIOUS CAUSES OF OBSTRUCTION IN THE CENTRAL ARTERY OF THE RETINA.*

By A. Hugh Thompson, M.D.
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The diagnosis, "Embolism of the Central Artery of the Retina," was first made by v. Graefe[1] in 1859. The patient, a watchman, suddenly observed his right eye becoming cloudy, and on closing the left found that the right, from being cloudy, very soon became blind. On ophthalmoscopic examination eleven days afterwards, the media were clear, the disc pale, the arteries much reduced, the veins also reduced, but fuller towards the periphery. In the absence of venous congestion such as would be produced by compression of the vessels in the nerve-trunk, in the absence also of any evidence of a wound such as might have severed the nerve, the diagnosis of arterial obstruction was clear. When, on further examination, the patient was found to be suffering from aortic obstruction and endocarditis, probably recent, the diagnosis of embolism as the cause of the obstruction was made. Two days later, on ophthalmoscopic examination, the largest of the veins showed an irregularity of "filling," being alternately more and less "full" in its course; there was also seen a breaking up of the blood column into cylinders, which appeared at times to be moving towards the disc, and at other times to be still, while at the same time the relative position of the fuller and less full parts of the vessel was altered. The veins appeared to be fullest at the edge of the disc, but on the disc itself quite empty. At times the blood appeared to pass rapidly across the disc as if every now and then a portion of the blood retained in the vein actually left the interior of the eye. The central region of the fundus appeared cloudy, and at the macula an intense cherry-red spot was seen, as well as grey-white stippling. Vision was reduced to perception of light on the temporal side of the field, but subsequently increased to counting fingers.

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* Founded upon a Thesis read at Cambridge, 1900, when the title of M.D. was awarded.

This description, with slight variations, might serve for the ophthalmoscopic picture of most of the cases which in the last forty years have been diagnosed as "Embolism of the Central Artery of the Retina." The only unusual points about it are: first, that the haziness of the central part of the fundus, with the cherry-red spot at the macula, were not noted until subsequent to the first examination, which took place eleven days after the onset of blindness; and second, the breaking up of the blood stream in the veins, a phenomena which is not ordinarily seen, the more usual cases being those in which a constant though vastly diminished circulation is maintained.

But though, since 1859, "Embolism of the Central Artery of the Retina" has been the generally accepted diagnosis of these cases, there have not been wanting sceptics who, from time to time, have attributed cases of arterial obstruction to other causes. Quite a large literature, in fact, has grown up, so that, for instance, in a recent article by Reimar,[2] to which I shall in the course of this paper have occasion very often to refer, no less than ninety-eight references are given to various publications all bearing on this subject. The present divided state of opinion is reflected in Norris and Oliver's "System of Diseases of the Eye," in the third volume of which Professor Schöbl[3] of Prague, after describing the ophthalmoscopic picture to which I have referred, gives embolism as the explanation and ignores all other possible causes, while when we turn to the fourth volume, Professor Haab[4] of Zurich gives it as his opinion that "the majority of the cases that present the picture of embolism of the central artery are not due to an embolism, but are probably dependent upon a local disease of the central artery such as atheroma, syphilis, endarteritis from chronic kidney-disease, or other dyscrasia."

Such being the conflicting nature of authoritative utterances, it has seemed to me worth while to attempt a summary of the actual state of knowledge in this subject so far as I have been able to collect it from the sources at my command, and to compare with each other the various explanations of the phenomena which have, from time to time, been put forward.

The following are the conditions which have been supposed to give rise to the ophthalmoscopic picture:—

I. EMBOLISM.—Not many years after the publication of von Graefe's paper, a case was published by Steffan[5] in which not the central artery of the retina, but the ophthalmic artery, was supposed to be the seat of embolism. The supposition that such a lesion could cause the same symptoms is altogether untenable, for the communications of the ophthalmic artery with the branches of the external carotid, and especially with the facial, are so free that no localised obstruction of the former could produce even a temporary cessation of circulation. It has been suggested, however, that in those cases in which the permanent loss of sight has been preceded by one or more momentary or very temporary attacks, an embolism may have been so caught as to obstruct the origin of the central artery of the retina from the ophthalmic, and after a minute or two, washed on into the general circulation.[6] This is indeed merely a surmise, for there are other explanations not less plausible to which I shall presently refer, and by which the cases with such prodromal symptoms may be accounted for.

In considering the theory of embolism, then, we may confine our attention to the trunk of the central artery, or to one of its branches. In many cases the suddenness of the loss of sight, and the total absence of any previous warnings or prodromal symptoms, suggests this explanation very strongly, even in the absence of any demonstrable heart lesion.

The following objections to the theory, however, have been put forward. (1) Soon after the onset of blindness there is a certain amount of blood circulating through the retinal vessels, whereas a total embolism would cause a total stoppage (Reimar [2]). The fact is undeniable. Sometimes an arterial pulsation can be produced by pressure on the eye-ball, as in normal eyes. It is seldom that the phenomenon of a granular stream is observed, and even if it is it shows only a great slowing of the stream, not a total stoppage. In this latter condition one would find the blood cylinders either stationary or showing to-and-fro movements. To account for this persistence of the blood-stream it has been supposed that an embolus may obstruct an artery without blocking it altogether, but, as Reimar remarks, the only conceivable emboli to which this would apply are those of a chalky nature—even to these the extensible walls of the vessel would adapt themselves more or less closely, and any chinks that remained would soon be stopped up by secondary thrombosis. A more ingenious explanation is that of Elschnig,[7] who supposes that the temporary contraction of the arterial wall excited by the embolus subsequently gives way to relaxation, allowing the passage of a certain amount of blood, and that meantime adhesion of the embolus has taken place to the endothelium of the vessel. But here, too, surely, secondary thrombosis would occur. The only means by which circulation can be re-established after embolism in the central artery of the retina, as in other parts of the body, must be the establishment of a collateral circulation. Now, as is well known, the branches of the central artery of the retina are terminal, and the only possible channel for anastomosis is the network of capillaries which surrounds the optic disc. That this channel is in some cases, at any rate, sufficient to re-establish the circulation to the small extent which is actually found, I think we have proof. Nettleship,[8 10] in Helmholtz's "Festschrift," gives a picture showing very considerable enlargement of the minute vessels of the disc observed in a case of obstruction, and Manz[9] in the same volume gives further evidence to the same effect. A further argument in favour of this explanation lies, it seems to me, in the not very unusual escape of the papillo-macular triangle in cases of obstruction, *i.e.*, of an area extending from the temporal margin of the disc outwards, with upper and lower borders converging to a point near the fovea, but generally a little to the inner side of it. In some of these cases there is an obvious cilio-retinal artery, *i.e.*, a vessel coming into view at the temporal margin of the disc and supplying the area in question, such vessel being apparently a branch of a short ciliary artery which pierces the sclerotic. When such a vessel is present it affords a sufficient explanation of these cases, but in other instances no such vessel can be discovered. In a case shown by me[11] at the Ophthalmological Society, though no cilio-retinal artery could be seen, a small vessel emerging from about half-way between the margin and the centre of the disc was present, apparently supplying the area in question. This may either have been a branch of the central artery arising from a point proximal to the place of obstruction, or it may have been an enlarged capillary. In another similar case, no cilio-retinal vessel could at first be seen at all. Afterwards a very minute one was discovered looping outwards from the temporal margin of the disc, and connected with an equally minute vessel that could be traced from the loop towards the centre of the disc. These cases seem to me to support the theory that the collateral circulation is sufficient to account for the small amount of blood that generally finds its way into the retinal arteries.

As a rule, in cases of embolism the function of all the retinal cells is destroyed before the collateral circulation by means of the capillaries has time to be established. In some cases the papillo-macular triangle is saved by a cilio-retinal vessel ; in other cases it escapes owing to the fact that the capillary anastomosis is freer with the vessels supplying this particular area than with those supplying the rest of the retina. In the more ordinary cases, when the loss of function is complete or very nearly so, the anastomosis is sufficiently free to re-establish a certain amount of circulation, though it is insufficient to restore the function of the retinal cells which have already been destroyed.

(2) A second objection to the theory of embolism is the lack of ophthalmoscopic evidence in its favour (Reimar[2]). Of course it is impossible that the position of a plug in the central artery before it branches can be seen with the ophthalmoscope, but several cases have been described in which one of the main branches has been obstructed, the observers of which have claimed to see the actual plug with the ophthalmoscope. Their descriptions, however, are ambiguous, and it is said, are more consistent with a local thicken-

ing of the internal coat of the artery than with an embolus.

(3) A similar objection urged by Reimar and also by Haab[4], is that not one of the sixteen published cases, in which the pathological examinations of eyes showing this condition is described, is quite convincing. The shortest interval between obstruction and excision was six weeks (Marple), and here the appearances described point rather to a thickening of the intima than to an embolus. As in the other cases the interval between blindness and excision was longer, the appearances were necessarily even more ambiguous. It may be admitted that the distinction between an old embolus, an old thrombosis, and a proliferation of the vessel wall, is not an easy one, and that fallacies may in this way creep in. But surely it is going too far to assert that in no case has a pathological proof of an embolus been forthcoming (Nettleship [12]).

I pass now to a second possible cause of obstruction, viz.—

II. HÆMORRHAGE INTO THE OPTIC NERVE SHEATH.—This explanation was first proposed by Magnus[13], in a case presenting the ophthalmoscopic picture of embolism, in which sudden blindness had occurred, with some subsequent restoration of vision in the nasal half of the retina. He supposed that the fibres of the nerve were so damaged as to abolish their conducting power, but that later on an absorption took place, those parts of the nerve which had been least injured regaining their function. Great diminution of the arterial stream might ensue if the hæmorrhage were considerable. On the other hand, as Reimar[3] remarks, "it would be to be expected that the blood would follow either the vessel-sheath, or at any rate would be bounded by the connective tissue septa, which divide the optic nerve into separate bundles." In default of any pathological evidence in support of this theory we can only regard it as a possibility, though one which must not be left out of account in cases where no other plausible explanation can be suggested, and especially where a tendency to epistaxis or other forms of hæmorrhage is present (compare also Gunn[14] and Collins[15]).

III. PRIMARY THROMBOSIS.—In 1884 Mr. Priestley Smith[16] related eight cases which he attributed to this cause. His diagnosis was based on the following points :—

(*a*) Previous attacks of transient blindness in the blind eye.

(*b*) A simultaneous attack of transient blindness in the fellow-eye.

(*c*) Previous or subsequent attacks of transient blindness in the fellow-eye, especially if the conditions of onset were the same in the permanent as in the transient attacks.

(*d*) Signs of disturbance of the cerebral circulation at the onset of the blindness—giddiness, faintness, headache.

In relation to this subject we must bear in mind that, so long as the endothelium of an artery remains intact, healthy blood, even though it be stagnant, does not clot in it. Only when the intima becomes disintegrated does this happen (Cohnheim[17]). Now, though in large arteries ulceration may take place as the result of atheroma, it is doubtful whether it ever does in small ones. On the other hand, modern physiology teaches that in certain abnormal states of the blood, primary thrombosis is possible. Certain substances resembling proteids when injected into the blood, or saline extracts of certain glands, may give to the blood this quality. It is said that snake venom poisons in this way (Schäfer[18]). It is by no means impossible, therefore, that certain abnormal conditions of the blood occurring in disease may render it coagulable with undue readiness; anæmia, for instance, may be one of them. It is, however, very difficult to imagine that in a typical case of retinal obstruction occurring in an otherwise healthy subject, the cause can be a diseased condition of the blood. The clotting would certainly occur in the veins before the arteries, and, in fact, in the physiological experiment to which I have referred it is always the veins in which the thrombosis first occurs. Now primary thrombosis of the central retinal vein is a condition which is sometimes diagnosed, and has been described from pathological specimens by Michel, Angelucci, Haab, Wagenmann,[19] and others, but the interpretation of the appearances in most, if not in all, of these cases is so doubtful that the actual occurrence of primary thrombosis in the vein must be considered unproved. Much more, therefore, are we justified in hesitating to accept the theory of primary arterial thrombosis.

Many of these cases in which the block occurs either in the vein or the artery, are more probably due to disease of the vessel walls, and some at any rate of the cases of arterial obstruction are certainly due to spasm.

IV. SPASM OF THE MUSCULAR WALLS OF THE ARTERY.—The validity of this explanation depends on the following :—

(1) The extreme sensitiveness of the inner layers of the retina to a continuous supply of arterial blood, so that if this is cut off even for a short time, the functions of the retina are permanently destroyed.

(2) Clinical evidence of spasm occurring in the retinal arteries.

With regard to the first point, the retina is, by development, part of the central nervous system, and the sensitiveness of the latter to a continuous supply of arterial blood is well known to physiologists. The exact time during which these cells may be deprived of blood without undergoing irreparable injury varies, I am told, with different animals and with different parts of the nervous system, but in all cases it is a matter of minutes, not of hours.

As to the second point, the evidence of the actual occurrence of spasm is both direct and indirect. In other parts of the body temporary attacks of arterial spasm are now known to occur in connection with Raynaud's disease, and migraine is generally attributed to a similar spasm of cerebral arteries. In connection with the eye there is evidence of the occurrence of attacks of temporary blindness occurring as a reflex manifestation, which could hardly be explained otherwise than by spasm. Thus in one of Mr. Priestley Smith's[16] cases, a sudden but temporary blindness of one eye repeatedly occurred in connection with the use of a vaginal syringe, and the existence of a particular tender spot which it sometimes touched. After several experiences of this kind, on one occasion the eye remained permanently blind, and the subsequent appearance of the fundus was "indistinguishable from embolism."

This is good indirect evidence of spasm, but there is better direct evidence from ophthalmoscopic examination. Raynaud in two of his cases saw that "occasional temporary alterations in the fundus oculi alternated or coincided with manifestations of asphyxia in the extremities" (Barlow[20]). Wagenmann[21] reported the following case in 1897. The patient, a man of 69, for two months had noticed frequent, and latterly almost daily, attacks of blindness in the right eye, coming on suddenly and lasting from a few minutes to some hours. He had had epileptiform attacks in childhood, but was now healthy except for arteriosclerosis. By a fortunate chance Wagenmann was able to observe him during an attack. "In a short time perception of light was gone, and with it direct and consensual pupil reactions. Externally no change. Ophthalmoscopically, disc pale, arteries appeared as shiny yellow streaks in which no blood column could be seen even with the direct method. Veins thread-like. No pulsation on pressure. Soon the retina became cloudy, and the fovea stood out as a round red spot. About ten minutes after the beginning of the attack, a fine red line was seen by the indirect image to appear in the arteries, and immediately afterwards the veins became large. Thereupon the patient had perception of light, and the pupil reacted a little. In a few minutes the circulation, and with it the vision, was completely restored." Six months later another attack led to complete blindness, with the ophthalmoscopic picture of embolism.

A similar instance was observed and fully reported by Benson[22] of Dublin.

These instances are sufficient, I think, to prove that there is such a thing as spasm of the central artery of the retina, and that it may sometimes persist sufficiently long to cause total blindness. The ophthalmoscopic picture is very much the same, whatever the cause of the cutting-off of the supply of arterial blood to the retina.

REFERENCES.

[1] v. Graefe, *Archiv. fur Ophtalmologie*, 1859.

[2] Reimar, *Archiv. fur Augenheilkunde*, vol. xxxviii., 1899.

[3] Schobl, Norris and Oliver's "System of Diseases of the Eye," vol. iii., p. 437.

[4] Haab, Norris and Oliver's "System of Diseases of the Eye," vol. iv., p. 501.

[5] Steffan. *Archiv. fur Ophtalmologie*, 1866.

[6] Mauthner, *Wiener Medicinische Jahrbuch*, ii., 1873.

[7] Elschnig, *Archiv. fur Augenheilkunde*, vol. xxiv., 1892.

[8] Nettleship, Helmholtz's *Festschrift*, 1891.

[9] Manz, *Ibid.*

[10] Nettleship, *Royal London Ophthalmic Hospital Reports*, 1887.
[11] Thompson, *Transactions of Ophthalmological Society*, 1899.
[12] Nettleship, *Royal London Ophthalmic Hospital Reports*, 1874.
[13] Magnus, *Klinische Monatschrift für Augenheilkunde*, 1878.
[14] Gunn, *Transactions of Ophthalmological Society*, 1896.
[15] Collins, *Ibid.*, 1897.
[16] Priestley Smith, OPHTHALMIC REVIEW, 1884.
[17] Cohnheim, "General Pathology," vol. i.
[18] Schäfer, "Text-book of Physiology," vol. i.
[19] Wagenmann, *Archiv. für Ophtalmologie*, 1892.
[20] Barlow, "Allbutt's System of Medicine," vol. vi.
[21] Wagenmann, "Report of the Heidelberg Ophthalmological Society," 1897.
[22] Benson, "Report of International Ophthalmological Congress," Edinburgh, 1894.

(*To be continued.*)

REVIEWS.

SCHIRMER (Greifswald). The Diagnosis, Prognosis and Treatment of Infected Perforating Wounds of the Globe. *v. Graefe's Archiv. für Ophtalmologie, liii.*, 1.

The acknowledged value of mercury in the treatment of sympathetic ophthalmia has suggested to Schirmer the systematic employment of the drug in those injuries which are especially prone to give rise to sympathetic trouble, namely, in infected perforating wounds of the globe. After employing this method of treatment for a time, he noticed that he was inclined to delay longer and longer the excision of eyes which he would formerly have removed at once, and a certain number of these eyes recovered useful vision. Still more important is the fact that in the whole series of his cases, extending over a period of six years, he has not one case of sympathetic disease to record. This alone would make it worth while to examine the account of his method and its results.

The following are, briefly, the points on which the author lays stress.

First, it is important that the treatment be begun *early*. Practically in all the cases which did not come under treatment till after the fourth day from the receipt of the injury the eye had finally to be excised; while of those in which treatment was begun within two days, considerably more than two-thirds recovered.

Secondly, *enough of the drug* must be given. Schirmer states his principle of dosage thus: "When a case of infected wound of the globe comes for treatment I ask myself, not how severe is the case and how much mercury will be necessary to cure it, but simply how much mercury can the patient bear?" Inunction with grey ointment was almost invariably employed, men receiving from 8 to 9 grammes daily, women 6 to 8 grammes, and children 1 to 3 grammes, according to age. In many cases, to obtain a more rapid effect, intra-muscular injections of biniodide of mercury (1 per cent. solution) were given at first. In nearly all, too, sub-conjunctival injections of sublimate solution (1-2000) were given daily, but here the mercurial salt was employed merely for its local action on the lymph-circulation, and usually after a few injections the better tolerated, but less efficient, sodium chloride solution (2 per cent.) was substituted for it.

During the energetic mercurial course the patient must be kept in bed, highly fed, and the strictest attention must be given to his mouth. Under these conditions it is usually well borne.

Thirdly, the drug must be given *for a sufficient length of time*. In several of his earlier cases Schirmer left off or greatly diminished the dose when decided improvement had set in, only to find a recrudescence of inflammatory symptoms follow in a few days; and it was invariably noted that the relapse was of a more obstinate character, and required more mercury to cure it than the original attack.

A case illustrating several points in the treatment may be quoted. A labourer, aged 22, had his right eye pierced by a nail from a firework. The next day there was much pain and vision was getting dim. On the third day he came under treatment. The eye presented a wound of the sclerotic, the edges of which were infiltrated with pus; much ciliary congestion, iris discoloured, fibrinous exudation in the anterior chamber, hypopyon, yellow-grey floating masses in the vitreous. The ciliary region was tender to pressure. He was immediately put to bed and given an injection of biniodide into the glutæus muscle, and a subconjunctival injection of sublimate, with 4 per cent. atropine ointment and warm compresses to the eye. During the next two days similar treatment; no improvement in the eye; the exudation in the anterior chamber had become more purulent. On the fourth day of treatment, however, the ciliary tenderness had gone and the exudation showed a tendency to shrink together. The intramuscular injections were now stopped and inunction begun; 8 grammes daily, with a sweating twice a week. The subconjunctival injections were continued three days longer.

Improvement now continued steadily, the anterior chamber was free in a week, and in a fortnight the vitreous had so far cleared that one could distinguish in it large floating membranes. The eye was now nearly free from redness, and the patient was allowed to leave his bed for two hours a day. The inunction was reduced to 4 grammes per day, and on the thirty-fifth day after the accident was stopped altogether, the vitreous having now cleared enough to allow of vision equal to $\frac{1}{5}$. A week later the eye was slightly injected, the next day rather more so, and the vitreous less clear; still more so on the next day and the next; and now some dots of keratitis punctata were visible on the back of the cornea. Schirmer had so far abstained from interference, doubting whether a relapse could really be developing after so favourable a course; but there was now no question about it and no time to be lost. Absolute rest in bed was again enforced, inunction was resumed, and the eye tied up. For two days the congestion still increased and a small hypopyon developed, but after this improvement began and progressed steadily until the eye was entirely free from redness and vision was $\frac{1}{4}$. But while the first course had occupied a month and required 96 grammes of ointment, the relapse extended over two months and necessitated the use of 186 grammes for its cure. The patient left the hospital, with directions to take iodide of potash for a month. At the end of that time vision was $\frac{1}{2}$, the vitreous being not yet quite clear. All treatment was then stopped and the eye remained well.

Besides his observations on treatment Schirmer deduces some useful hints on diagnosis and prognosis from his sixty-two cases of infected wounds of the globe. The most vital point in prognosis is to be able to recognise an eye which must be enucleated, and the following are, in his opinion, the most important danger-signals :—

Suppuration in the Vitreous.—This is always of evil omen, though, as the case above quoted shows, by no means necessarily fatal. The presence of pus in the vitreous can rarely be directly determined, and there is no entirely unequivocal external sign of it. All the facts of the case must be taken into consideration. The site of the original wound is of great importance. In almost all of Schirmer's cases in which pus was found in the vitreous, the wound had primarily opened the vitreous chamber; in one only, and that a very neglected case, had suppuration spread from a corneal wound to the vitreous. To intensity of the inflammatory injection with rapidity of onset, and to the presence of œdema of the lids must be given some weight, but both these signs may be absent in abscess of the vitreous and may be present with a simple iritis. More to be depended on in Schirmer's experience is the early development of a copious exudation in the anterior chamber, covering the iris, and showing no tendency to sink to the bottom of the chamber. He considers that if within three days of the receipt of the wound a considerable fibrinous or fibrino-purulent exudation has developed in the anterior chamber, it is practically certain that there is suppuration in the vitreous.

Distinct *tenderness of the ciliary region* (not merely in the region of the wound) is of very serious import, nearly all the eyes in which it was present having been ultimately lost.

Likewise of bad omen is *diminished tension*, coming on after complete closure of the wound. In a few cases, however, the tension rose again after a time, and the eye recovered with fair vision.

The results of Schirmer's cases may be summarised as follows :—

		Recovered	
	Enucleated	With V. less than $\frac{1}{10}$	With useful vision
Infected wounds ...	31 % ...	21 %	48 %

Finally, Schirmer adds a word of warning against operating prematurely for optical purposes on eyes that have recovered from infected wounds, such eyes behaving very much as "sympathetic" eyes do under such circumstances. He considers, however, that operations may safely be undertaken when three months have elapsed after complete subsidence of inflammatory symptoms.

W. G. L.

POWER. Depression of Cataract. *British Medical Journal, October* 20, 1901.

Depression or reclination of cataract has at least two arguments in its favour, namely, its antiquity, for it was the operation of Galen and Celsus, and its popularity among unlicensed practitioners. The vast improvement in the instruments employed in extraction as compared with those of former days, the discovery of means of inducing general, and still more of causing local anæsthesia, and above all the introduction of the antiseptic theory and practice, have all contributed to push reclination so completely into the background that it is no exaggeration to say that a large proportion of the surgeons of to-day have never even seen it performed. Mr. Power, however, in a paper read in the sectional meeting at Cheltenham of the British Medical Association, indicates that in his view this entire neglect of a mode of operation so time-honoured and so frequently performed by the immense army of

Indian and Chinese quacks may, under certain circumstances, be a mistake. He points out forcibly that, to judge from the statements of a number of surgeons in India, couching is apparently often attended with good, and sometimes even with brilliant results, and that if this is so when the methods and the instruments are so primitive and crude, one might fairly expect a large proportion of successes under better conditions. The Indian ophthalmic surgeon comes across a number of cases of failure of the operation, of course, but the opinion of the best informed seems to be that the proportion of successes is very large.

Mr. Power first considers carefully the different ill-effects which have been from time to time found to interfere with the success of the operation, and shows how these may to a certain extent be avoided, and how they are not inherent in the operation. Vomiting used to be the great dread; but vomiting may occur perhaps nearly as readily after extraction, and is not, when all is said and done, destructive of the globe on all occasions by any means. As for septic inflammation, this used to occur with some little frequency, but one must recollect that the time at which these operations were performed was prior to the introduction of the antisepsis idea, and we might fairly count upon saving a much larger proportion of the eyes operated upon to-day than was the case sixty or a hundred years ago.

The irido-cyclitis, which is another of the dangers, is chiefly to be attributed, in Mr. Power's opinion, to the lens becoming broken up under the pressure employed. The danger of the occurrence of glaucoma, he thinks, has been exaggerated. Lastly, the risk of sympathetic ophthalmia is of course present, but is this any more likely after depression than after extraction?

The cases for which Mr. Power considers that depression might prove suitable he classifies thus:—

(1) In very feeble and infirm persons, in whom a wound might perhaps not heal at all.

(2) In very deeply-set eyes with narrow palpebral

fissures, or in which some similar mechanical difficulty in the way of a good extraction operation exists.

(3) In chronic conjunctivitis which refuses to yield to treatment, and in the presence of dacryocystitis.

(4) In extreme deafness, for the patient is less likely to do himself harm at the operation and after it if depression is performed.

(5) In patients of unsound mind or mental deficiency.

(6) In fat, flabby, and phlegmatic patients, for these—especially if they are gouty—do not stand operation well.

(7) In presence of chronic bronchitis with much coughing.

(8) If there are complications, such as tremulous iris, fluid vitreous, &c., for sometimes after an incision in such an eye the vitreous drains away and the eye shrinks completely.

(9) When the other eye has been subjected to extraction and has been lost.

(10) In the extremely rare condition of the hæmorrhagic diathesis.

Previous iritis, with adhesion of the iris to the capsule of the lens, must be considered a prohibitive obstacle.

It may be that under certain conditions reclination may prove to be of value, but in the present state of our knowledge it can only be regarded as a bad substitute for extraction when that procedure is strongly contra-indicated. But it is not probable that in eyes with narrow canthus, or in presence of dacryocystitis it will "come in," for other and more satisfactory means of avoiding the dangers exist than the alteration of the method of operating.

W. G. S.

FUCHS (Vienna). Atheromatous Ulcer of the Cornea (Necrosing Inflammation of the Corneal Cicatrix). *von Graefe's Archiv. für Ophtalmologie, liii.*, 1.

In dense scars of the cornea, and in staphylomata, into whose formation iris tissue largely enters, certain degenerative changes are apt to occur, chiefly in the way of the formation of hyaline material and the deposition of lime salts. In such scars also ulceration is prone to take place, the process being accompanied by abundant pus formation, so that flakes of calcareous matter are often found loose on the floor of the ulcer; these ulcers too have the peculiarity not merely of perforating somewhat rapidly, but also of leading to panophthalmitis. The result of this is that many an eye passes from the condition of staphyloma into that of phthisis bulbi.

To this form of ulcer Arlt gave the name of atheromatous ulcer of the cornea, on the ground of the resemblance which the process in the cornea bears to that in the internal coat of the aorta in atheroma; it has been given other names as well, including that of scar-keratitis, but this is too vague without some qualification. The author proposes as suitable, sloughing inflammation of the corneal cicatrix (*sequestrirende Narbenkeratitis*). The essential part of the process is the sloughing of the scar or of a portion of it; probably pyogenic organisms obtain access to the tissues in virtue of certain peculiar relationships which exist between the scar and its epithelium, some of which will be mentioned immediately.

A scar such as is liable to break down in this fashion is almost invariably the result of an extensive perforation of the cornea, and consists in remains of corneal tissue and shreds of iris substance, united by firm connective tissue, in the midst of which one can sometimes detect remains of Bowman's and of Descemet's membranes. In it one meets with strong, coarse, longish fibres, binding all together; the vessels, which in such an eye were at first very manifest, begin to diminish and disappear, as do also the nucleated cells, and the older the scar the more completely have these changes asserted themselves. There can be no doubt that in such an eye the tissue activity is reduced to a very low ebb, and as a consequence certain constituents of the blood or lymph stream begin to become deposited in the tissues, notably the lime salts. Both the hyaline and the chalky degeneration are at their maximum in the superficial layers of the cornea, since not only is evaporation most ready to occur in that situation, but also because, owing to the physical conditions, vessels and lymph spaces can hardly be said to exist in the scar tissue. Often, indeed, the only trace of a structure at all consists in the presence of a few coarse fibres, showing that formed tissue formerly was there.

Both of these transformations, hyaline and calcareous, have their origin in the formation of small particles in the tissue substance ; neighbouring particles of hyaline material enlarge and unite into larger masses, which always remain distinct from the tissues ; but in the case of the lime particles the deposits are very small but extremely numerous, until at last the whole substance seems impregnated with the lime salts homogeneously, and there is no sharp line of demarcation between lime-infiltrated and more normal tissue, such as there is with the hyaline material. In later stages, however, it seems as if the uninfiltrated portions retracted slightly from the chalky plates, leaving a minute space between. It is just possible that this may be to some extent an artificial change brought about by the hardening agents employed in preparation of the specimen, but at least during life there must be some degree of readiness to separate off ; and it is this which leads to the invasion by pus cells and the casting off of the calcareous plate as a sequestrum.

The condition of the scar tissue has great influence upon the overlying epithelium ; if it be vascular and succulent, the epithelium is thick and in many layers, but where it is hard, dry, and non-vascular, the latter is thin, scaly, atrophic, and apt to be imperfectly continuous. If the surface of the scar is uneven, the epithelium may be thick and plentiful over the depressions, and scanty over the elevations. In some sections of a scar in this condition, quite long projections of epithelium may be seen running into the scar tissue and giving rise to an appearance strongly recalling the aspect of an epithelioma. It not infrequently happens that just over a plate of lime salts is one of those patches at which the epithelium has gradually thinned off and atrophied away, for of course such a patch can supply no nutriment, and thus the calcareous plate will be laid bare. Another process to which the scar tissue is liable is that of becoming horn-like, and this process may extend quite deeply at the expense of the layers of living cells; in this way, again, may the epithelium be deprived of its nutriment, and die. Yet another process inimical to the life of the epithelium is also of not infrequent occurrence: the formation, namely, of cracks or fissures between the underlying cells. These are due to the invasion of fluid between the cells, whose action is to break up the continuity of the tissue. A fourth process is that of the formation of little blebs or vesicles on the surface of the scar tissue, raising up the epithelium; this condition is often spoken of as keratitis vesiculosa or bullosa, but this is not a correct expression, for there is no true inflammatory element in the process. It is a change which is not often seen except in cases in which the tension is high, but sometimes is observed where there is a large corneal cicatrix, even without any rise of intraocular tension. In certain cases the epithelium itself is alone raised up; in others the fluid has also over it a homogeneous membrane, or even a few fibrous layers, in which case the bleb is not so evanescent as in the others. With the disappearance of the vesicle, the surface of the scar tissue is left bare.

Fuchs has thus shown that in four different ways the epithelium, which should be the protecting coat of the deeper tissue, may be removed, namely, by simple dying away; by cornification of tissue with subsequent casting off of the epithelium; by fissuring of the epithelium from the action of fluid forcing the cells apart; and lastly, by the raising up of the epithelium over blebs which subsequently give way and flatten down again. The loss of the most trifling particle of epithelium in any of these ways, or by even an extremely slight injury, is capable of giving occasion to the formation of an atheromatous ulcer. It is worthy of remark, too, that it is not unusual to find the epithelium deficient on the anterior face of a chalk plate, but making its way at the same time in behind it, where it gradually forms a continuous layer, and thus the plate may be cast off.

Supposing now that in one or another of such processes bacteria obtain access, inflammation is at once induced, and may result in necrosis of the whole thickness of the scar; once pus formation comes into close relation with such a condition of cornea sloughing is decidedly apt to occur. This sloughing or progressive ulceration has a very marked disposition to extend itself in depth rather than in superficial extent; it is specially for this reason in many cases that panophthalmitis takes place.

The portion of the cicatrix which sloughs always includes its entire thickness; into it the pus cells make their way, separating its fibres from one another, and often isolating any calcareous plate or hyaline mass which may be included in it, and causing this to be cast off separately. This necrosis *en masse*, which is a characteristic of the atheromatous ulcerative process, naturally is most apt to affect the central portion of the scar, since this is the part most removed from the blood-vessels which should nourish it. The process of separation begins superficially, and at the margin of the furrow between the living and the dead the epithelium proceeds to grow down till it is stopped by unseparated fibres and can go no farther in that direction, it then works in between the more superficial and the deeper layers of the scar tissue towards the periphery again, until in some cases quite a considerable portion of the anterior stratum of the scar is lined with epithelium on both surfaces.

The cases which Fuchs has examined anatomically and thus described are of course the worst of all, for they have all gone on to panophthalmitis and enucleation; probably in the slighter forms there is simply a throwing off of the calcareous plates and perhaps of the superficial layers of low vitality; the sloughing process does not affect the entire thickness of the scar. It strikes one at once that there is a very important and vital difference between atheromatous ulcer and the ordinary "hypopyon ulcer" or ulcus serpens, in respect that in the former, should perforation occur, panophthalmitis is almost sure to follow, whereas that is fortunately not the case in the latter. The difference is evidently due simply to the condition of the iris, which is entirely unlike in the two forms of ulcer. In the atheromatous ulcer the iris is closely incorporated in the cicatrix, and pathogenic organisms find ready entrance to it and so to the ciliary body and vitreous, while in the hypopyon ulcer the iris presents an unbroken surface and there is "no admittance."

A further element in the causation of the inflammatory process is to be found in the wandering in of bacteria; these are to be observed chiefly in the zone of infiltration surrounding the necrotic portion; they may be seen gathered in great numbers at the apex of such a wedge-shaped area as is formed by their invasion at the periphery of the cicatrix, and in smaller numbers may be found in the superficial layers of the sequestrum.

The essential features of the atheromatous ulcer are thus seen to be necrosis of a portion of the feebly-nourished cicatricial tissue, this being either merely superficial or extending deeply according to circumstances; the actual onset of the necrosis is due to the invasion of micro-organisms, which is facilitated by the unphysiological relations of the epithelium to the underlying tissue; the necrotic portion is cast off as a slough, and the process may extend deeply into all the other tissues of the globe.

W. G. S.

DANVERS (Florence). Spring Catarrh of the Eyes. *London: John Bale, Sons & Danielsson.*

This work of some sixty small octavo pages was the subject of the author's thesis for the Italian diploma in medicine. It will be read with interest by ophthalmologists, as the disease, though known for years, is certainly rare. The index of contents gives a pretty complete summary of what is contained in the monograph. A brief mention of the earliest descriptions, a short account of the etiology, a description of the symptoms, notes of a series of cases, with observations on the histology, and short chapters on diagnosis, prognosis and treatment, form its contents. While the little book contains nothing absolutely new, it has the more important virtue of containing nothing that is not true.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, JANUARY 30, 1902.

Mr. DAVID LITTLE (the President) in the Chair.

CARD specimens and patients shown :—

Unusual Refractive Change after Removal of a Congenitally Dislocated Lens.—Mr. George Keeling showed a woman who had already been brought before the Society in December, 1899, after the extraction of the left lens for congenital subluxation and glaucoma. Since this time the right eye has been operated upon. On examination the right eye shows some dense lenticular remains in the anterior chamber covering the upper and outer part of the pupil, some lying in front of the iris, with a clear and active pupil. Vision with + 14·5 D. sph., $\frac{6}{6}$; with + 17 D. sph., J. 1, at 12 inches. The chief point of interest in the case was the remarkable alteration in the refractive condition of the eye, a myopia of 32 D. having become a hypermetropia of 14·5 D., a total change of 46·5 D.

In the right eye before operation the lens was dislocated down and outwards ; under a mydriatic the patient, by bending her head downwards and forwards, was able to bring the lens into the anterior chamber almost completely, only the upper and inner part of it remaining posterior to the iris. At this time there were 32 D. of myopia, and the vision with — 18 D. was $\frac{6}{18}$. Two attempts were made by Mr. Keeling to extract the dislocated lens; the first, undertaken after the patient had brought the lens into the anterior chamber by bending her head downwards and forwards, was not completed owing to the lens slipping back into the vitreous on completion of the corneal incision. At the second operation the lens was first fixed in the anterior chamber by means of a needle passed through the outer sclero-corneal margin; the incision for extraction was made with a keratome, and the greater part of the lens removed with the help of a scoop. With the correcting glasses there seemed to be binocular vision, but each eye showed a slight latent divergence without the glasses.

Retinitis Proliferans and Persistent Hyaloid.—Mr. H. R. B. Hickman. The patient, a man of middle age, had had no previous illness, but had always been subject to very severe colds, during which he was a very violent sneezer. On examination of the right fundus several large curtain-like vitreous opacities were observed, having pigment on their free borders, as well as several accumulations of choroidal pigment round the periphery of the retina. The optic disc was not visible, but above and to the inner side of its usual position was seen a long horizontal white line, or ridge, with fine vessels upon it; none of the usual retinal vessels could be seen. This white ridge extended forwards into the vitreous. The vision, which had failed suddenly six months previously, was $\frac{6}{24}$, having improved from only finger-counting to this in six weeks.

On examination of the left fundus, a tube-like structure was apparent coming forward from the disc towards the posterior surface of the lens, bifurcating at its extremity, one limb passing towards the lens, the other passing downwards and apparently becoming continuous with a horizontal white ridge low down within the vitreous chamber. Also up and out from the disc three or four patches of recent hæmorrhage were present, and vitreous opacities in large numbers. This eye, according to the patient's statement, suddenly became dim after he had been out for some little time in a cold east wind.

Congenital Anomaly of the Optic Disc.—Mr. G. W. Roll. The right optic disc in this patient, a boy, was grey, showed a shallow excavation, and was surrounded by a wide, raised, white border which increased the apparent size of the disc enormously. The white border was pigmented in places. The retinal vessels were small and very numerous, and appeared at some distance from the centre of the disc, none being visible in the shallow excavation. The veins and arteries were of the same calibre and very similar in colour. From the centre of the disc, extending forwards and outwards in front of its lower and outer margin, and protruding into the vitreous, was a reticulated filmy membrane having a clearly-defined upper border. The choroid was decidedly mottled and very pale just round the disc. Several large, scattered pigment patches were situated round the inner border of the disc, over which the retinal vessels could be traced. Vision: R.E., perception of light only; L.E., with + 4·5 D. $\frac{6}{12}$.

Congenital Bilateral Anophthalmos.—Mr. Arthur W. Ormond. A boy baby, 7 months old, and the only child of parents who are first cousins. Externally the orbit and palpebral fissures together with the eyelids appear normal, excepting for a slight discharge from both palpebral fissures. The fissure on the right side is slightly larger than that on the left. On closer examination there is seen to be entropion of both lids, and fine, pale eyelashes, few in number and diminutive in size. All the puncta lachrymalia present and patent, but when the child cries the tears run over the cheeks. The orbits are smaller than normal. Under an anæsthetic no trace of a globe could be made out, the conjunctival sac simply ending in a longitudinal slit which admitted a probe for a short distance, then it entered a *cul-de-sac*. The mother stated that the child had never opened its eyes from birth, but otherwise was quite healthy and normal; no history of any illness or of injury. On the parents' side there was no history of any similar abnormality, nor of any peculiarities in any of their relatives.

Pseudoglioma due to Congenital Membrane.— Mr. Herbert Parsons. A series of microscopical sections cut from the left eyeball of a 4-months-old baby. While in the orbit, the tension of the globe was stated to have been considerably raised and a white mass was seen lying behind and in contact with the posterior surface of the lens, but no blood-vessels could be made out on its surface. The mass was thought to be a glioma, and the eye removed accordingly.

In the sections the cornea was normal, the anterior chamber shallow, but the angles patent, as was also the case with the canal of Schlem. The iris, the lens fibres, and its anterior capsule were normal. The posterior capsule, however, was replaced by a layer of fibrocellular tissue continuous with similar tissue from the suspensory ligament and with fine fibres running through the vitreous, the capsule itself was much thickened. The ciliary processes were in contact with the edges of the lens all round and showed no inflammatory thickening. The retina, choroid, and optic nerve were all normal, and there was no trace of a persistent hyaloid.

In favour of this being a congenital membrane, and against its having any inflammatory origin, or being newly formed, Mr. Parsons adduced the following arguments :—

(1) The dissimilarity of the fibrocellular tissue from newly-formed inflammatory tissue.

(2) The absence of inflammatory deposits in other parts of the eye.

(3) The shallowness of the anterior chamber.

(4) The contact of the ciliary processes with the lens, pointing to arrest in development.

(5) The dense mass of nucleated fibres in the position of the suspensory ligament.

Reference was made to a similar case cited by Mr. Treacher Collins, in the *Royal London Ophthalmic Hospital Reports*, vol. xiii., p. 326, but in this case, although no hyaloid was present, there was a hæmorrhage at the back of the lens.

Fenestrated Metallic Balls used by Professor Pflüger in Mules' Operation.—Mr. Inglis Taylor. These globes, made of silver-gilt, costing 3s. 6d., have several fenestrations at their posterior pole to allow of the granulations entering and filling the globe, thus keeping it securely in position. They are stated to give rise to no irritation, but since they have only been adopted in some twelve cases, of which four were failures (it having been necessary in these to remove the globes by snipping off the granulations with scissors), no very great advantage seems to be gained over the use of the simple globe.

Unusual Deposit on Inner Surface of each Cornea, of Recent Origin and Slow Development.—Mr. R. Marcus Gunn. On the posterior surface of each cornea an unusually shaped, opaque, white deposit was present. The deposits were roughly S-shaped, with many irregular curves and angles, and at each bend, as well as at the extremities, a nodular deposit ; the whole figure resembling in shape the Greek letter λ. The case had been under observation for some considerable time and the deposits are said not to have been formed by the aggregation of small dots, but to have gradually grown in length and breadth. The opacities presented a worm-like aspect, the largest being on the left cornea. No choroidal disease was to be found, but the vitreous was full of dust-like opacities.

The patient, a woman, aged 33, single, showed evidences of inherited specific disease, both in her teeth and from her history, but no traces of former choroidal disease, or of keratitis, could be obtained. There was a family history of tubercle. She had had two attacks of what appeared to be ordinary cyclitis, with keratitis punctata and dust-like vitreous opacities, together with much ciliary injection and misty vision. During one of these attacks, when the right eye was affected, a fine haze was noticed over the lower part of the anterior surface of the cornea, with several large greyish clumps on its posterior surface.

Papers :—

On Intracranial Thrombosis as the Cause of Double Optic Neuritis in Cases of Chlorosis.—Dr. C. O. Hawthorne. The writer quoted the case of a young woman, the subject of chlorosis, but not in an extreme degree, in whom optic neuritis had come on coincidently with paralysis of the external rectus muscle of the right eyeball. He took this case as a type of cases occasionally met with, though he himself had but come across this single instance. He pointed out that hypermetropia, the condition of the blood, and the presence of a poison in the circulation, all of which had been put forward as an explanation of the occurrence of optic neuritis in cases of chlorosis, were none of them competent to produce unilateral ocular paralysis. On the other hand, he considered that an intracranial thrombosis would readily explain such a paralysis, and would at the same time account for the optic neuritis. Hence, assuming that the two events depended on one and the same cause, Dr. Hawthorne presented thrombosis as the most probable in the circumstances. In support of this proposition he referred to the tendency to venous thrombosis, admitted to exist in chlorotic patients ; to cases in which thrombosis affecting the intracranial sinuses and veins has been known to produce optic neuritis ; and to other cases of the same nature, in which muscular paralyses were included among other symptoms : he also quoted cases in which middle ear disease, together with optic neuritis and ocular paralysis, had been observed. From these facts he argued that if in a case of chlorosis, thrombosis could cause double optic neuritis together with an ocular paralysis, it was at least highly probable that the same, *i.e.*, thrombosis, even explained the optic neuritis which sometimes occurs as the sole unusual event in chlorotic females.

Thrombosis, he suggested, may in one sense be regarded as a tumour, and may, in all probability, thus cause swelling of the optic discs without necessarily directly obstructing the venous return for the eyeballs, whilst by leading to a localised hæmorrhage, œdema, and softening, it may readily interfere with the centre or trunk of one or more cranial nerves.

In the discussion which followed the reading of this paper, Sir William Gowers said he believed he was the first to describe optic neuritis as a result of chlorosis, but the cases he had described were uncomplicated by any cerebral symptoms whatever. There was headache certainly, but the headache in chlorosis stands for very little as an indication of the presence of cerebral disease. He could not conceive that intracranial thrombosis could be present without any symptom whatever of some intracranial change. Also, he asked, where could the thrombosis which caused the paralysis of the sixth nerve be situated ? He considered certainly not in the cavernous sinus. He considered it far too wide a step to conceive thrombosis to be a common cause of optic neuritis, or optic neuritis occurring in chlorosis to be due to intracranial thrombosis. While pointing out that optic neuritis occurred in cases where there was no evidence whatever of sinus thrombosis, he gave it as his opinion that we do not yet understand how it is that disease of the middle ear may give rise to optic neuritis. In conclusion, he feared that all facts were against the opinion that a tumour causes optic neuritis by giving rise to thrombosis. He believed that thrombosis can act like a tumour only when the clot has been produced by septicæmic contamination, but not otherwise.

Note on the Treatment of Cystoid Cicatrix following Cataract Extraction.—Dr. G. A. Berry. The writer considers that the absence of complete consolidation in some portion of the scar resulting from the incision made for extraction of cataract, and resulting in more or less cystoid swelling, is a condition which should never be left untreated, not only on account of the irritation and discomfort which it may cause, and from the greater than usual degree of astigmatism occasionally associated with it, but chiefly on account of the risk attaching to this cicatricial defect, since any injury to it may afford an opportunity for micro-organisms to find entrance into the deeper parts of the eye, and thus give rise to destructive inflammation. In spite of taking all precautions to secure perfect apposition of the lips of the wound, the writer finds that in from 2 to 3 per cent. a cystoid defect appears somewhere in the cicatrix. Out of 200 private extractions this complication occurred five times. He stated that he found evacuation of the aqueous rarely happened on opening the cyst, therefore he considers it is but seldom that any direct communication exists between the cyst and the anterior chamber, although the scar tissue probably admits of infiltration. In many cases the defective portion in the scar can be easily seen through the transparent cyst wall, and it always becomes apparent after the cyst has been opened. He finds that in cases in which this defect has existed for some time, the cyst is larger than the defectively united portion of the scar. As to treatment, he recommends the actual cautery as the most efficient remedy, and advises that the conjunctival wall of the cyst should be first slit up from end to end in such a manner as to allow the cyst wall finally to act as a conjunctival flap ; the cyst wall is then turned down and the wound and cavity well irrigated, after which the defective portion of the scar is touched with the fine point of a thermo-cautery. The cauterisation should not be deeper than to penetrate through half the thickness of the scar, and should be done parallel with the scar, and not perpendicular to it. The writer stated that in only one of his cases was it necessary to repeat the operation.

A Case of Tumour of the Orbit (*Endothelioma*) *occasioning a Peculiar Varicosity of the Vessels on the Surface of the Eyeball.*—Mr. Simeon Snell. The patient, a female domestic servant, aged 19, complained that one of her eyes projected forwards, and that for three months it had been bloodshot ; later on also a tumour had been noticed below the eyeball. The left eye projected about $\frac{1}{4}$ of an inch further than the right ; there was no œdema of the lids, but the ocular conjunctiva below showed a peculiar varicose condition of the veins. The growth presented as a swelling at the inner part of the lower lid, it was smooth, firm, and not nodulated, occupied the lower and inner wall of the orbit, and was found at the operation to extend along the floor of the orbit to its extreme end. The eyeball, in addition to being pressed forwards, was also turned somewhat upwards. Globe movements were normal, except downwards, which was limited ; diplopia was present. Vision, $\frac{6}{6}$. The growth was removed by means of a horizontal incision through the lower lid at the orbital margin, the eyeball itself left *in situ*, and the growth removed from below it. It was found to extend to and run along the anterior part of the optic nerve. On examination of the growth after removal it was found to be encapsuled, elastic, reniform in shape, measuring $1\frac{1}{4}$ inches in length, $\frac{3}{4}$ inch in width, and $\frac{1}{2}$ inch in thickness. After the operation the eyeball very shortly receded to almost its normal position, and the vision remained $\frac{6}{6}$. Mr. E. T. Collins made a microscopical examination of the growth and reported it to be an endothelioma.

A Case of Ringworm of the Eyelids in an Adult, due to a Large-spored Tricophyton, probably of Animal Origin.—Mr. Simeon Snell. The patient, a strong, healthy man, aged 34, engaged in agriculture, besides having this patch on the eyelid, showed two patches on the right arm of a similar nature. From these patches he complained of neither pain nor itching.

The lesion on the eyelid was oval in shape, 2 inches in length and 1¼ inches in width, reddish-purple in colour, with four pustular points in it, its edges being raised. It involved the outer half of the upper lid and reached the temple just beyond the outer commissure, which it also involved, together with the corner of the lower lid and the eyebrow. The eyelashes were loose and many had fallen out; the whole of the lid was red and œdematous, especially at the ciliary margin. It was from the first considered to be cattle ringworm, since the patient kept two cows. The patches appeared first on the arm and later on the eyelid; he always worked with bare arms. When treated with yellow oxide of mercury ointment it rapidly cleared up. Microscopically a large-spored fungus, situated chiefly in the scales and round the hairs, was found, which was considered to be megalosporon ectothrix.

Some Observations on the Visual Purple.—Dr. F. W. Edridge-Green. This was the report of a research undertaken to ascertain whether any objective evidence of the diffusion of the visual purple into the yellow spot of the retina could be obtained. Dr. Edridge-Green considered that many phenomena point to this conclusion, such as the fact that a perceptible interval of time elapses before we are able to see with the yellow spot after looking at any object, particularly if it be a brilliant one; also that a light may fall on the fovea at such times without producing any visual sensation. With this object in view, and with the assistance of Mr. Treacher Collins, a monkey's eye was examined, when it was at once observed that the visual purple certainly extended to the yellow spot, but the very deep yellow colour of the spot prevented any evidence being obtained as to whether the colour altered on exposure to light. Numerous chemical agents were tried, in order to ascertain whether any substance could be found which would fix the visual purple, but without success, since nearly every chemical tried destroyed the purple altogether. Examined under the microscope, the yellow spot was at first red, then gradually bleached under the influence of light, and an appearance of rose-coloured cones surrounded by one or more circles of colourless rods was observed just external to the yellow spot. On another occasion, when assisted by Mr. D. Marshall, two monkeys were kept in a dark room for twenty-four hours; their eyes were then excised by the light of a ruby lamp, and the retinæ arranged on slides and put under the microscope. The retina was bright crimson, and the brightest part of all was the yellow spot; it was also seen that the visual purple was situated between, and not in, the cones in the rod-free district of the yellow spot. In a few minutes the visual purple bleached, leaving the yellow spot of its usual yellow colour.

CONGENITAL WORD-BLINDNESS, WITH REPORTS OF TWO CASES.

By James Hinshelwood, M.A., M.D.,
Surgeon to the Glasgow Eye Infirmary.

In a paper published in the *Lancet*, May 26, 1900, dealing with this subject, I said "that I had little doubt that these cases were by no means so rare as the absence of recorded cases would lead us to infer. Their rarity, I thought, was accounted for by the fact that when they did occur, they were not recognised."

In the Ophthalmic Review, for March, 1901, Mr. Nettleship gave notes of five cases of great difficulty or inability to learn to read which had come under his observation in the ordinary course of his practice, and which he regarded as belonging to the class of cases which I described in my *Lancet* article by the terms "congenital word-blindness." Mr. Nettleship regarded my explanation of these cases as affording a clear and accurate conception of a condition which had hitherto attracted little notice, but which was not on that account necessarily, or even probably, of rare occurrence; and if even moderately frequent had considerable importance.

Since Mr. Nettleship's paper I have met with other two cases, a fact which confirms the opinion already expressed, that this condition is by no means a rarity. The condition is one of such frequency that it is a matter of great importance that ophthalmic surgeons should be familiar with it and able to recognise it

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when it does come under their notice. Nor does the diagnosis present any great difficulty. The clinical features are so distinct and easily understood that the true character of such cases is easily recognised. In the first case reported in the present article the father of the child had accidentally come across my paper on "congenital word-blindness," and having read it at once correctly concluded that his child's case belonged to this category and accordingly he brought her to see me. This incident alone shows the importance of a diffusion of knowledge regarding this subject, which has hitherto practically received little or no attention.

Case 1.—The child, a well nourished, healthy-looking girl, aged 10 years, well grown for her age, was brought to me on April 23, 1901. She had always enjoyed excellent health after a very severe illness when 4 years of age, when she suffered from measles complicated by whooping cough and pneumonia. The child went to school four years ago, and has experienced the greatest difficulty in learning to read. After four years of laborious effort she only reads now the book of the first standard, and that with the greatest difficulty. It took nine months of hard work before she learned the alphabet, and even at the end of nine months she knew it only imperfectly. So great was her difficulty in learning it that at times it seemed an impossibility, and on several occasions her mother abandoned the task in despair. She however returned to it again and again, and after nine months' labour she learned, although imperfectly, the letters of the alphabet, though even yet she makes occasional mistakes in naming the letters. Since then she has not got beyond the book of the first standard, which she reads with difficulty and slowly, having to spell out most of the words except the very small familiar ones, such as "the," "of," "in," "to," &c. These small common words are the only ones which she recognises by sight alone. The others she has to spell out either aloud or silently, in the former case appealing to her auditory memory and in the latter to the memory of speech movements.

In her education, this difficulty in learning to read by sight has been the only one encountered. Her general intelligence is good and her memory good in all other respects. Her auditory memory is excellent, and she learns passages by heart rapidly and well. She spells well, and has no difficulty in spelling at once words which she cannot recognise by sight. She writes fairly to dictation, and there has been no difficulty in teaching her to write. She has had no difficulty in keeping up with the other children in her arithmetic, and no difficulty has been encountered in teaching her to read figures, which she does with fluency. She has learned addition and subtraction, and is at present working at multiplication. Her vision is good.

Case II.—A boy, aged 7 years. This healthy and, in other respects, intelligent child, has now been three years at school, but cannot be taught to read. At the request of the schoolmaster the boy was brought by his parents to the Glasgow Eye Infirmary, September 5, 1901, to see if the difficulty in learning to read was due to any ocular defect. His vision was found to be normal, and his eyes healthy. He does not even know all the letters of the alphabet, but if gently told when he was wrong and given time, as a rule he can name the letter correctly at last. He can repeat the alphabet rapidly by heart. He can scarcely read a single word without spelling it out letter by letter. Even such short words as "on," "cat," "rat," must be spelt out aloud, letter by letter, before they are recognised. I observed repeatedly that after spelling out and naming a word, if he comes to the same word a line or two lower down, he does not recognise it. There has been no difficulty in teaching him orally, and his auditory memory seems excellent. He was pushed on for a time with the other children, because he successfully concealed the fact of his inability to read, by learning his reading lesson by heart. His mother says that he is a smart, intelligent boy, even smarter and quicker in many respects than her other children, his one defect, according to her, being that he cannot be taught to read. He can spell fairly. He can form all the written characters well to dictation. Figures he reads correctly and fluently up to twenty, but beyond that he is rather uncertain.

I had an opportunity of examining this boy again on November 30, when I found that most satisfactory progress had been made. On my advice no further attempts were made to teach him in the class, but he was advised to have special reading lessons by himself. The lessons were not to be too long, but were to be repeated frequently during the day at intervals so as to refresh and strengthen the visual impressions made in the first lesson. This plan was adopted, and succeeded in a degree which surpassed all our expectations. I found he could now read all the letters of the alphabet, and also the whole of the child's first primer, with sentences containing words of two and three letters. He could name all the words by sight without spelling them out letter by letter. I tested him by reading the sentences backwards in case he had learned them by heart, but he responded quite readily. He could also read figures fluently up to 100, and it has always been observed that there has not been the same difficulty in teaching him figures as there has been in teaching him words and letters.

With regard to Case 1, a similar course of treatment was recommended, but not having seen the patient again as yet, I cannot report the further progress.

With regard to diagnosis, I would point out in the first place that every case of inability to learn to read is not necessarily a case of "congenital word-blindness." A short time ago, a child was brought to me who after being two years at school did not know the letters of the alphabet, and it was therefore suspected there must be something wrong with its eyesight. On examination I found that this inability to learn the letters was not due to any defect of vision but to a cerebral cause, and yet I did not regard it as belonging to that category which I have described as "congenital word-blindness." On careful examination I found that all the forms of memory were defective. The child was not only unable to learn to read, but could not learn anything by heart. His mother could not trust him to perform the simplest message correctly. Not only were all the forms of memory defective, but the child's general intelligence was defective. The inability to learn to read was not in this case due to any local, but to a general failure of cerebral development; hence it did not come under the category of cases described by the term "congenital word-blindness."

In the two cases recorded in my first paper (*Lancet*, May 26, 1900) and in the two now recorded, there was no other cerebral defect about the children. The other forms of memory were good, and in all of them the auditory memory was excellent. In fact, in two of these four cases it was so good that the children, though unable to read by sight, had actually learned the contents of their book by heart, and so concealed their defect for some time. The children in every respect seemed bright and intelligent, and able to hold their own intellectually with those of the same age in every respect except in learning to read.

In such cases, then, when we have satisfied ourselves by careful examination that the eye is healthy and the visual acuity is normal, the diagnosis of "congenital word-blindness" may be made with confidence. When the child does not know any of the letters, we can test its visual acuity by its ability to recognise minute objects such as dots and lines. We must carefully exclude the possibility of any ocular defect, before we are entitled to infer that the inability to read is due to any cerebral defect.

In my book on Word-blindness[1] it has been pointed out that in learning to read there are two distinct stages, (1) acquiring the visual memory of letters; (2) acquiring the visual memory of words. As there are only twenty-six letters in our alphabet, or, taking capital letters also, fifty-two in all, the first stage as a rule is mastered by the congenitally defective, even although it may require much longer time and a much greater effort than normal. It is when the second stage is entered upon, viz., the learning to read words by sight, that the defect of "congenital word-blindness" is brought specially to notice. With regard to Case 2, the boy's schoolmaster wrote in answer to my inquiries as follows: "A year ago he was placed in the class for Senior Infants, and since then the defect you point out has been observed, as in this class the children are expected to get beyond the stage of requiring to spell words, but rather to recognise them as we do by their picture." It is this failure to recognise the words by their picture that is the essential feature of this "congenital word-blindness." Such patients can read if you allow them to spell out each word letter by letter. Their auditory memory may be excellent, and it is to this they appeal when spelling out a word letter by letter. In some cases, they will be able to tell you the word, if you allow them to spell it out silently. They appeal then to their memory of speech movements—their glosso-kinæsthetic memory, as it has been called by Bastian. If you do not allow them to spell out the word aloud or to move their lips, but depend upon the sense of sight alone, then you find they cannot recognise the words. In ordinary rapid reading, each word is recognised by its general outline, as a word-picture, without any analysis into individual letters. Before we are able to do this fluently we must have considerable practice, in order to store up in our visual memory the images of so large a number of words, even where there is perfectly normal cerebral development. We know also from pathological experience that these visual images are stored up in a special area of the brain, viz., the left angular and supra-marginal gyri.

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[1] "Letter-, Word- and Mind-Blindness." London: H. K. Lewis, 1900.

Now if there is within this area any abnormality of the cerebral tissue due to disease or faulty development, it is easy to understand how such individuals may experience the greatest difficulty in storing such a vast number of visual images as to enable them to read by sight, and in some cases there may even be an impossibility.

In the four cases of congenital word-blindness quoted in my first paper it was particularly observed that none of these patients had any difficulty in learning to read or manipulate figures. In Case 1 of the present paper it will also be observed that the child experienced no difficulty in learning figures, and had easily kept up with the rest of the class in arithmetic, although so far behind with her reading. In Case 2 the child read figures much better than letters, but his training in arithmetic had not really begun. These cases afford further proof of my contention that the visual memories of letters, words and figures, are deposited in different areas of the cerebral cortex. I have already published, in my book on word-blindness, many cases of acquired word-blindness, where the patients, not able to read words, are still able to read figures with perfect fluency, and hence in cases of "congenital word-blindness," where the same area of the brain is at fault, we are not surprised to find that many of these patients, who experience such great difficulty in learning to recognise by sight words and letters, have no difficulty whatever either in recognising figures by sight or in manipulating them. This very fact would at once suggest to the careful observer that the difficulty of such a patient in learning to read was not due to an ocular but to a cerebral defect.

It is evident that it is a matter of the highest importance to recognise as early as possible the true nature of this defect, when it is met with in a child. It may prevent much waste of valuable time and may save the child from suffering and cruel treatment. When a child manifests great difficulty in learning to read and is unable to keep up in progress with its fellows, the cause is generally assigned to stupidity or laziness, and no systematised method is directed to the training of such a child. A little knowledge and careful analysis of the child's case would soon make it clear that the difficulty experienced was due to a defect in the visual memory of words and letters; the child would then be regarded in the proper light as one with a congenital defect in a particular area of the brain, a defect which, however, can often be remedied by persevering and persistent training. The sooner the true nature of the defect is recognised, the better are the chances of the child's improvement. In the early period of life, the brain cells and fibres are more capable of marked development than in the later periods, and hence the earlier the systematic training of the individual, the better the chances of overcoming the difficulty.

I have recommended in such cases the use of sets of block letters. This enables the child to assist the visual memory by the sense of touch. When it has mastered the letters, it can then arrange these into words. The sense of touch seems to give some real assistance to the weakened visual memory in retaining the visual impressions.

There is no use of attempting to teach such children reading in a class along with other children with normally developed brains. The contrast between their difficulty and the facility of the others will only discourage them. Such children must be taught separately by special methods adapted to help them to overcome their difficulties. Nor must the teacher be easily discouraged. Because it is found that the child cannot learn to read with the same rapidity as other children, there is a temptation to abandon the task of teaching them as hopeless. But experience has taught us that persistent and persevering attempts will often overcome difficulties which at first sight seem insuperable.

With the children of the well-to-do, when such a defect is observed, there will be no difficulty in carrying out the education of the child, but what is the lot of such a child attending one of our crowded infant elementary schools? It may be years before the true nature of its defect may be observed. Its individuality obscured amongst a crowd of children, it may manage for a time to conceal its defect by learning its lesson and repeating it by heart, as did one of the children referred to in this paper. Even when it is observed that the child cannot keep abreast with the others there is no adequate means of dealing with such defective children. The result is that the most valuable years are lost for training purposes, those precious early years when the brain is most plastic, when it is most receptive of impressions and most capable of further development.

Hence the importance in our educational scheme of special provision for dealing with the education of "backward" and "defective" children on a scientific basis. Those "backward" and "defective" children ought to be examined by those capable of differentiating the various defects and arranging them into groups, a proceeding which would greatly simplify their further training.

THE VARIOUS CAUSES OF OBSTRUCTION IN THE CENTRAL ARTERY OF THE RETINA.

By A. Hugh Thompson, M.D.

Surgeon to the Western Ophthalmic Hospital, London.

(*Continued from* p. 72.)

V. Disease of the Arterial Walls is the last cause of obstruction with which we shall have to deal; it probably is at least equal in importance to embolism itself. It is generally assumed that this is only an indirect cause of obstruction, the immediate cause being thrombosis; but this assumption is unnecessary, for a local swelling of the intima may reduce the lumen of an artery to such an exceedingly narrow channel or slit that the resistance offered to the onward passage of the blood is very great.

Consequently, any temporary diminution of blood pressure, either through weakening of the heart's propulsive force, or through opening up of channels of diminished resistance elsewhere, may allow the vessel walls in this particular spot to come into contact and so stop the flow of blood altogether. The stoppage, however, need be only temporary, for the blood may stagnate without clotting, and with an increase of pressure from behind, the stream may be re-established. Meantime, however, irreparable injury may have been done to the retinal cells beyond the seat of obstruction.

Now, the occurrence of such a swelling of the internal coat of small arteries as might produce such an obstruction is a proved fact. In some old-standing cases of Raynaud's disease (Barlow[20]) the condition has been found in the arteries of the extremities, so that in these cases the local asphyxia was due partly to the spasm and partly to arterial disease; and it is not unreasonable to suppose that in the eye too, mixed cases of this sort may occur. At any rate arterial disease of this sort does occur in the retinal vessels.

Reimar[2] gives figures from microscopical specimens illustrating this from a case observed by him. Raehlmann[23] relates the following case :—

A peasant girl aged 23, non-syphilitic, on the second day after her third confinement, in which she had lost much blood, became suddenly blind in both eyes. About a week afterwards some sight returned to the right eye, which eight weeks after the attack had vision $= \frac{8}{200}$. She was taken into hospital and immediately had a profuse flooding, lasting four days; on the fifth she died. *Post mortem*, there was chronic interstitial nephritis, hypertrophy of the heart, œdema of the brain, and a diffuse arterio-sclerosis of the large vessels. While in the hospital she had had many ophthalmoscopic examinations, which showed narrowing of the vessels in several places. On pathological examination, the arteries, besides a general narrowing of the lumen through endarteritis, showed at those places where the narrowing of the blood-column had been visible to the ophthalmoscope, a complete obliteration of the lumen by a localised swelling of the intima.

Again, Ischreyt[21] gives evidence of retinal arteries being obliterated from this cause. Admitting, however, the occurrence of disease of this nature in the retinal vessels, there seems to be a somewhat remarkable diversity in the symptoms which it produces. In some cases profuse retinal hæmorrhages are present, so that the cases are diagnosed as "Thrombosis of the Central Retinal Vein." In other cases few, if any retinal hæmorrhages are observed, and the ophthalmoscopic picture is that of embolism of the central artery, to which reference has so often been already made.

One may suppose that in the former cases the proliferating process has attacked the endothelium of the veins principally, while in the latter cases, it has attacked the central artery itself. Whether this explanation is sufficient we must wait for pathology to determine.

It remains to consider the nature of the obliterating process in the retinal vessels, and here we are as yet very much in the dark. Atheromatous disease of the large arteries affords no parallel. On the other hand, syphilis is well known to cause proliferation of the internal coat in the arteries of the brain, and the microscopical appearances of these arteries as described by Dr. Mott,[25] are very similar to those described in the retinal vessels. But according to Gowers, it is the large arteries at the base of the brain that are affected with syphilitic disease, not those of a similar size to the central artery of the retina.

In recent years a disease has been described under the separate name of "Endarteritis Obliterans" or "Endarteritis Proliferans." It is thus referred to by Dr. Mott :—

"The disease is more frequent in men than women ; it affects adults between 30 and 60. The causes are unknown. It is not associated with any particular diathesis, nor with any acquired disease, such as syphilis, alcoholism, malaria, albuminuria or diabetes."

"Microscopical examination reveals thickening of the walls of the arteries due to cellular proliferation of the endothelium and hypertrophy of the middle and external coats, development of the vasa vasorum in the middle and external coats, and inflammatory thickening of the small vessels which may have led to complete occlusion. The obliteration of the lumen of the artery may be due to thrombosis or proliferating endarteritis. The coats of the veins may be thickened, but these vessels are not blocked."

Reimar,[2] on the other hand, regards endarteritis proliferans as one of the manifestations of arteriosclerosis, a general disease, which may in some cases leave such arteries as the temporal and radial entirely unaffected, and attack the small arteries alone, in which it takes the form of a proliferation of the intima without ulceration.

The matter may be said to stand thus: The proliferating process does affect the retinal arteries; its relationship to particular diseases is at present uncertain; the mechanism by which it may produce obstruction of the central artery of the retina or of its branches is explicable, but an actual case of an eye which during life has presented the ophthalmoscopic picture typical of embolism, and which after excision has been proved to have been affected in this way, has yet to be recorded.

A complete answer to the questions raised in this paper must await further pathological evidence from excised eyes. Meantime in the clinical examination of all cases I would suggest that in addition to an examination of the heart and the testing of the urine for albumen, which are now generally undertaken, we should make careful enquiry into the history of prodromal attacks, either in the affected eye or in its fellow, and into any conditions which might give rise to reflex arterial spasm; that anaemia, pregnancy, or other conditions likely to favour thrombosis, be noted, as also syphilis, or any other condition likely to give rise to arterial disease. In making an ophthalmoscopic examination of these cases, it would be well to note particularly the following points:—

(1) Whether the blood column in either arteries or veins is granular, and if so, whether the granules appear stationary, or whether they show a uniform,

or a to-and-fro, motion ; (2) whether slight pressure on the eyeball produces any pulsation in either artery or vein, which would show that some circulation persists ; (3) whether there is any obvious enlargement of the small vessels on the disc ; (4) whether the blood column in any vessel shows irregularities such as might be due to a local swelling of the intima of the vessel ; (5) whether, at places where one vessel is crossed by another, the extent to which the deeper of the two is obscured is greater than one would expect from the size of the blood column in the more superficial of them :—this would show a thickening of the walls of the latter ; (6) the size and nature of any hæmorrhages that may be present ; and (7) whether there are any vascular changes to be seen in the (presumably) sound eye.

REFERENCES.

[23] Raehlmann, *Fortschritte der Medicin*, 1889.
[24] Ischreyt, *Archiv für Augenheilkunde*, 1900.
[25] Mott, "Allbutt's System of Medicine," vol. vi.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

FRIDAY, MARCH 14, 1902.

Mr. ADAMS FROST occupied the Chair.

CASES :—

Ectropion of the Uveæ.—Mr. G. Hartridge. The left pupil, which reacted to a mydriatic slightly, showed well marked ectropion of the uveal pigment ; vision was $\frac{6}{18}$. The right pupil, which also reacted to a mydriatic slightly, showed well marked ectropion uveæ above, below and to the outer side, and in addition on the inner side a large globular mass of pigment, very dark brown in colour and about the size of a small pea, which gave one the idea that it might readily become separated from its attachment and lie free in the anterior chamber as a foreign body ; vision in this eye $\frac{6}{18}$.

The Chairman believed the condition analogous to that sometimes seen in the lower animals, especially in horses, and that the pigment was very liable to become detached and lie as a foreign body in the anterior chamber.

Papilloma of the Conjunctiva.—By Mr. G. Hartridge. The patient, a man aged 61, had come to hospital with a large fleshy tumour projecting from between the right eyelids, resting on the lower lid and in part on the cheek. The tumour was 21 mm. by 10 mm. by 5 mm., reniform, with a nodular surface, and connected with the conjunctiva by a thick pedicle some 6 mm. in length and having three roots of origin. One of these was attached to the conjunctiva of the upper lid above the caruncle and stretched to above the mid line of the cornea, which it overlapped at its upper and inner part; another root extended below the cornea, and the third area from the conjunctiva intermediate between these points. The tumour itself was firm and elastic, and the conjunctiva red and swollen, with much secretion and some flakes of lymph. The tumour was removed on account of its inflamed condition.

The pathological report was:—A soft fibroma, inflamed and degenerated, and in the centre undergoing myxomatous degeneration; the pedicle consisted of thickened and vascular conjunctiva, of which the epithelium showed proliferation. The tumour had been growing about three or four months.

Melanotic Sarcoma of the Orbit.—Mr. H. Work Dodd. The tumour, which was very solid, weighed about 7½ ozs.; the pathological report showed it to be a melanotic sarcoma, completely filling the orbital cavity, enveloping the globe, and adherent to the bones of the orbit, particularly at the apex. The patient, a woman aged 71, was admitted into the hospital on February 1, with a swelling above the left orbit about the size of a large orange, roughly circular in shape, and having a smaller growth in connection with it at the external angle of the orbit, and attached to the bone. The swelling extended from just above the eyebrow down to the level of the nostril on that side, and as far outwards as to within 4 cms. of the external auditory meatus. In colour it was a bluish-red, with dilated veins over it and several hard nodules; in one place there was a shallow ulcer. The eyelids were stretched over the growth as it protruded from the orbit, the eyelashes being widely separated from each other. The lids were not attached to the tumour but freely movable over it. The swelling was hard and solid, could be moved in most directions, and gave rise to considerable discharge. Not the slightest trace of the eyeball could be made out. The preauricular gland was enlarged, hard and tender, as well as the gland at the angle of the jaw.

The patient had been operated upon in 1897 for glaucoma in both eyes; iridectomies had been performed, of which the right had done well; but the left eye had still continued painful after the operation for a very long time. In consequence of the continual pain and trouble in the left eye, in 1898 the patient was advised to have it removed, but declined to do so and discontinued attendance at the hospital. She, however, still continued to have repeated attacks of pain in the eye, and in May, 1901, it began to swell and became very red. The swelling was intermittent, but the pain was continuous and became rapidly greater. She began to experience pain also at the back of her head and in her neck on the left side, where a swelling appeared which eventually broke down, discharging a great deal. Nodules were felt in the liver, on her admission into the hospital. On February 15, 1902, the left orbit was cleared out; the patient stood the operation well, feeling much better after it. On March 2, the cavity was skin-grafted after Thiersch's method, the greater number of grafts living. The patient died on March 5.

Pathological Report.—Melanotic sarcoma surrounding the partially collapsed globe, with much pigment, varying from dark grey to light brown, several hæmorrhages; the cellular structure consisted of medium sized round cells interspersed with much fibrous tissue; a golden brown pigment lay chiefly between the cells. The structure of the affected pre-auricular gland resembled that of the primary growth, but it was not pigmented. The left optic nerve within the cranial cavity was not invaded by the growth, but was small, thinned and translucent. The liver, brain, kidneys and glands, were affected by growths resembling the primary one.

Calcareous Tumour of Orbit.—Mr. H. Work Dodd. Inside the middle part of the lower margin of the right orbit of a woman aged 50, a hard circular mass, the size of a large bean, could be felt. It was freely movable, and could be pressed back into the orbital cavity, or protruded on pressure downwards towards the cheek. It was neither painful nor tender on manipulation. An incision was made through the lower lid, just about the margin of the orbit, and on pressure being applied downwards, the mass, which was freely movable, and quite unattached, was suddenly extruded from the cavity in which it had been lying.

On examination it was found to consist of an outer capsule of connective tissue with an inner hyaline lining, containing five round calcareous bodies of various shapes and sizes, which were easily decalcified, leaving a hyaline homogeneous matrix with necrotic centre. The patient had noticed the lump below her right eye ten years before coming for treatment. She stated that it had first appeared after having a "black eye," the result of a severe fit of coughing in the night.

Retinitis Circinata.—Mr. J. Herbert Fisher. In the left fundus of this patient was seen an oval ring of bright white exudates situated in the deeper layers of the retina surrounding a mottled and pigmented macula. The arteries were brilliant in appearance, and in places crossed the circinate ring, which did not appear to be raised above the general level of the retina. This ring was stated to have become distinctly more complete during the twelve months the patient had been under observation, fresh formation having taken place at the upper and inner part of it. Outside the circinate ring also on its inner side, between it and the optic disc, a dotted white change in the retina was apparent, some of these dots being brilliantly reflecting, and apparently consisting of cholesterin. The right eye also showed similar retinal dots in the central region, but no circinate arrangement. The vision, with + 2 D., was $\frac{6}{9}$. The vision in the left eye was $\frac{1}{60}$: not improved. There had never been any hæmorrhages in this eye. The urine simply showed an excess of phosphates. The patient was a woman, aged 59, who had been very healthy except for her eye trouble.

Early Changes in the Retina following upon a Blow upon the Eyeball.—Mr. J. B. Lawford. The patient, a boy, aged 8, was struck in the left eye by a dart from an air-gun on February 28, and was brought at once to the hospital with a small laceration beyond the corneal limbus to the upper and outer side. The iris adjoining was detached; there was hyphæma, but the lens remained uninjured. The extravasated blood absorbed slowly, and the tension of the eye remained slightly lower than that of the right for ten days. The changes in the fundus were first noticed on March 11 (the tenth day after the injury), when some turgescence of the retinal vessels and slight œdema of the disc were apparent. Over a large area adjoining the disc, extending towards the macula, and also upwards and downwards, numerous small corpuscular pigment deposits, all in the inner layers of the retina, and many visibly internal to the retinal blood vessels, were observed. No hæmorrhage, no detachment of the retina, and no rupture of choroid could be made out. A very delicate horizontal striping of the retina in the region of the macula could be seen, and a light appearance of the affected area, which was probably due to partial destruction of the hexagonal pigment layer.

Mr. Lawford called particular attention to the remarkably short time (ten days) in which these marked changes had come about.

Peculiar Affection of the Choroid; symmetrical; marked absence of pigmentation.—Mr. Reginald E. Bickerton. The patient, a labourer aged 38, first attended Moorfields Hospital under Mr. Collins in February of this year, complaining of a mist before both eyes, which he had only noticed from two to three months; he also stated that he could see best in dull lights. He was found to be suffering from tobacco amblyopia (had been in the habit of smoking $\frac{1}{2}$ oz. of shag tobacco a day, and had a central scotoma for red and green in both eyes in consequence). The vision when he first attended was $\frac{6}{60}$ and Jaeger 20; but it had now improved to $\frac{6}{36}$ and Jaeger 12 with either eye.

Fundus.—In both eyes, the choroid in the region between the disc and macula is occupied by small, angular, yellowish-white patches, which are separated from each other by apparently unaltered choroid; no pigmentation surrounds them and they are neither raised nor hollowed out; the retinal vessels, which are normal in size, run over the patches in front of them. These patches—which do not owe their whiteness to the sclerotic—are not evenly distributed over the fundus, but are found in both eyes chiefly between the disc and macular region symmetrically, also along the course of the inferior temporal vessels; few are found above or internal to the discs except in the right eye, in which some isolated patches are seen above and on the inner side of the disc. The macula itself and the periphery of the fundus are free from them.

In the right eye there is an entire absence of the pigmentation usual with choroiditis. In the left eye there is a single small isolated patch of black pigment towards the lower periphery, but not in relation with any of the patches, since the fundus in this particular region is free of patches. The discs are normal with the exception of a paleness on the outer side. No vitreous opacities are present. The patient had always been healthy; there was no definite specific history. Urine normal. Field of vision slightly contracted but no scotoma for white.

Artery and Vein displaced into the Vitreous.—Mr. R. W. Doyne. The superior temporal artery and vein in the patient's left eye appear to leave the retina about two disc diameters from the disc itself, pass into the vitreous and again join the detached retina at the periphery. A few days previously the vein is stated to have ruptured where it left the retina, and at the present time can be seen hanging on the detached portion of the retina. The vitreous was very full of large and fine floating opacities, many of which were probably caused by hæmorrhage from the torn vein, since several very large masses were present.

Fatty Calcareous Degeneration in the Retina.—Mr. Herbert Parsons showed microscopical sections of the retina of an eyeball injured some two years previously by a snowball. Fourteen days after the injury the vision was only perception of light, the tension in the eye was increased, and later an intra-ocular hæmorrhage appeared to have occurred. The eye, which was sightless, and in which a well marked yellow reflex was observed, was enucleated under suspicion of a new growth being present.

The retina showed much fibrous tissue and was degenerated throughout. The fibrous tissue at the ora serrata was continuous with the choroid. The pigment epithelium was adherent to the choroid, and the rods and cones had quite disappeared. Only a remnant of the nuclear layers could be made out lying in a meshwork of connective tissue derived in part from Müller's fibres. Two or three large oval swellings of fibrous tissue were present, one at the ora serrata on the nasal side, and another in similar position on the temporal side. These fibrous swellings in section showed much fibrous tissue with calcareous material embedded in them having fat globules and crystals distributed throughout. The fibrous mass on the temporal side was entirely within the retina. The optic nerve was degenerated, and the vitreous converted into a fibrous network containing blood clot and cholesterin crystals.

Microscopical Sections of Arcus Senilis.—Mr. Herbert Parsons. One section showed the fat globules stained and *in situ.* Another showed the same tissue after the fat globules had been dissolved out by ether, and the tissue then stained; the fat globules were visible on the surface of the section.

Papers :—

Symmetrical Concentric Folds of Choroid and Retina in four Cases of unusually High Myopia.—Mr. R. Lawford Knaggs.

Case I.—The patient, a man aged 40, had been losing his sight for three years. Vision: R. = Jaeger 6 at 2 inches: L. = Jaeger 19 at 3 inches. The refractive condition as follows: R. —20 D vertical meridian; —23 D. horizontal meridian. L. —33 D. vertical; —35 D. horizontal.

Ophthalmoscopically: thinning of the choroid, large posterior staphyloma, and a peculiar crescentic fold of both choroid and retina amounting almost to a detachment on the nasal side of each disc, the inner curve of the crescent facing the disc. In the left eye the edge of this fold was marked by a sharp margin, black in colour; several vessels, in crossing the fold, showed a distinct rupture of continuity as they dipped. The fold was limited above by branches of the superior nasal vessels, and below by the inferior. On the surface of this fold a well marked rent was made out, extending through the retina and choroid, and showing the sclerotic through it, with its edges turned up towards the vitreous. In the right eye a similar fold existed, but with no rent in it, the choroid being distinctly made out participating in the fold, and red in colour.

Case 2.—Patient, a man aged 27. Refraction: R. —38 D.; L. —33 D. Vision: R. with —35 D. $\frac{6}{36}$; L. with —33 D. $\frac{6}{36}$.

Ophthalmoscopically: in the right eye a large posterior staphyloma: macular region dusky in colour and broken up by pale lines into irregular spaces. No choroiditis. On the nasal side of the disc the same crescentic fold already described, sharply pigmented at its edge facing the disc, and the same interruption in continuity of the vessels with parallactic movement. Further to the nasal side, but parallel with the fold, was a pale streak over which the vessels mounted, probably a wrinkle of choroid and retina. The left eye showed the same fold but no streak, the fold lying a little nearer to the disc, and bifurcated at its upper extremity; there was no rent in it.

Case 3.—Patient, a man aged 42. Refraction: R. —31 D. vertical; —38 D., horizontal. L. —23 D. vertical; —19 D. horizontal. Vision: R. nil.; L. —20 D. sph., with —2 cyl. axis horizontal, $\frac{6}{36}$.

Ophthalmoscopically: posterior staphyloma, and stretching in macular region in the right eye. In the left, posterior staphyloma, patches of choroiditis and atrophy near the yellow spot. Similar folds in each eye on the nasal side of the discs, and rather closer to it than in the two former cases. The folds faced the disc and the vessels curled over the edges similarly.

Case 4.—Patient, a woman aged 32. The right eye had been excised. Refraction of the left —24 D. vertical; —18 D. horizontal.

Ophthalmoscopically: large posterior staphyloma, with a patch of choroidal atrophy as large as the disc. The macular region pallid and speckled with pigment dots and granules. A fold on the nasal side of the disc as in cases above. This fold was some four or five times as long as the disc, with the vessels foreshortened as they passed over it.

Mr. Knaggs pointed out that in these four cases the most noticeable feature was the presence of the fold, which in all the cases was vertical in direction and on the nasal side of the disc, and was present in cases in which there was little if any choroiditis. He considered it to be a detachment of choroid and retina, and this opinion he thought was borne out by the appearance of the rent in one case with its edges curled up towards the vitreous. He also thought the black appearance of the fold to be due to the greater depth of pigment at the edge where the choroid and retina turned back upon themselves, and where consequently the pigment layer would be foreshortened. Since the fold only appeared in eyes having a high degree of myopia (from —18 D. to —38 D.), he considered it a direct result of the elongation of the eyeball. As the globe enlarges, the choroid, carrying with it the retina, is permitted to slide back towards the posterior pole by the stretching of its anterior attachment, and the fold is produced on the nasal side of the disc because the optic nerve firmly fixes the choroid to the sclerotic on this (nasal) side of the posterior pole, thus checking the sliding movement and leading to a reduplication of the two tunics within the area over which the effects of the obstruction are felt. Also the absence of choroidal inflammation may have something to do with allowing this sliding of the two coats to take place.

Membranous Conjunctivitis, with Cases.—Mr. Walter H. H. Jessop. Accompanying the paper is an abstracted report of 13 cases in some detail. All the cases were treated as in-patients at St. Bartholomew's Hospital, and the bacteriological researches carried out in the pathological department by the late Professor Kanthack and Dr. Andrews.

Membrane.—In all these cases most distinct membrane was present, which on being stripped off left a raw granulating surface : in colour the membranes varied from white to yellow, and in degree from thin strips to the consistency of tough wash-leather ; the membrane lasted from two to eleven days.

Part Affected.—In twelve of the cases the superior palpebral conjunctiva alone was affected ; in only one case was membrane present on the fauces ; the skin of the lids or other parts was affected in four cases ; only two of the cases had both eyes affected, the other eleven, one only.

Glands.—In ten cases the preauricular glands were affected.

Cornea.—In only two cases was the cornea affected, in one of these (non-diphtherial) extensive corneal ulceration and necrosis resulted in a corneal nebula : in the other (diphtherial), perforation

TABLE.

	Eye	Membrane	Glands (enlarged)	Fauces, Nose	Temp.	Urine Albumin	Bacteriology	Treatment	Duration of Membrane in days	Eye Complications	Result
1.—S. G., 2, m., Oct. 94	B	Ashen grey, firmly adherent, sup. and inf., palp. conjunctiva	None ...	Nose muco-purulent discharge	101·6	None	Streptococci	Quinine internally, mercury lotion	7	Corneal ulceration	Corneal nebula.
2.—Th. F., $1\frac{9}{12}$, m., Nov. '94	L	Yellow grey, tough sup. palp. conj.	Pre-auricular and angular	Soft palate	102	Cloud	Klebs Loeffler —guinea pig	Antitoxin	9	—	Complete recovery.
3.—W. B., $\frac{9}{12}$, m., Dec. /94	B	White opaque, Rt. both palp. conj., Lt. sup. palp. conj.	Pre-auricular	Nose muco-purulent	100	Trace	Klebs Loeffler	Antitoxin	9	—	Complete recovery.
4.—R. F., 29, m., March /95	R	Extensive white, sup. palp. conj.	Pre-auricular	—	Normal	Cloud	Klebs Loeffler	Mercury lotion	4	—	Complete recovery.
5.—E. A., 3., f., August /95	R	Thin strip grey, sup. palp. conj.	Pre-auricular	Nose muco-purulent	100	Cloud	Klebs Loeffler	Antitoxin	6	—	Complete recovery.
6.—T. C., 2, m., Sept. /95	R	Thick yellowish grey, sup. palp. conj.	Pre-auricular	—	104	Cloud	Klebs Loeffler	Antitoxin	6	—	Complete recovery.

7.—E. H., 3 $\frac{10}{12}$, m., Sept. 99	R	Thick grey, sup. palp. conj.	Pre-auricular, angular, cervical	—	102	Cloud	Klebs Loeffler	Antitoxin	9	Corneal ulcer perforation	Abscission
8.—F. N., 9, m., Jan. 99	L	Thick yellowish white, inner and outer surface lower lid	Pre-auricular	—	101	Trace	Klebs Loeffler —guinea pig	Quinine lotion	7	—	Complete recovery.
9.—J. B., 9, f., March ,01	L	Grey narrow strip, sup. palp. conj.	None ...	—	Normal	None	Streptococci	Boracic lotion	4	—	Complete recovery.
10.—A. H., 8, m., Oct. 01	L	Yellowish, sup. inf. palp. conj. and ciliary margin	Pre-auricular, sub mental, superficial, cervical	—	Normal	None	Staphylococcus albus	Quinine as lotion and internally	3	—	Complete recovery.
11.—E. C., $2\frac{1}{2}$, f., Oct. /01	R	Yellow, white shreddy continuous on cutaneous and conj. surface	Pre-auricular, sub-mental	—	101	None	Pure cultivation staphylococcus aureus	Antitoxin	11	—	Complete recovery.
12.—A. P., 11, m., Dec. 01	R	Thready yellowish white, ocular conjunctiva	None ...	—	Normal	None	Staphylococcus albus	Boracic lotion	2	—	Complete recovery.
13.—M. F., $\frac{1}{12}$, f., Jan. ,02	L	Grey white in islets, both palp. conj. and skin of lid	Pre-auricular, sub-mental	—	Sub-normal	—	Klebs Loeffler —guinea pig	—	7	—	Complete recovery.

followed, with loss of the eye. The other eleven cases made a complete recovery.

Bacteriology.—In eight cases Klebs Loeffler bacillus was found and cultivated, and these eight cases were undoubtedly diphtherial. In two cases streptococcus pyogenes alone was found ; in two cases staphylococcus albus alone, and in one case staphylococcus aureus. Klebs Loeffler bacillus in the eight cases was not only diagnosed from the microscope, but also from cultivations and Neisser's reaction ; injection of a guinea-pig was followed by the usual signs.

General Symptoms.—The diphtherial cases gave clinical signs of the disease, seven had albumen in the urine, all had enlargement of the glands, especially of the pre-auricular. In eight cases the temperature rose to 100°, or over. All the diphtherial cases showed symptoms of being physically ill. In none of the cases, however, did the writer find any signs of paralyses of soft palate or accommodation, or loss of knee-jerks.

Treatment.—The treatment was antitoxin in six cases, and lotions of quinine, corrosive sublimate, or boracic acid in the others.

Mr. Jessop considered from these cases that there is a distinct class of membranous conjunctivitis associated with, and produced by, other micro-organisms than the bacillus of diphtheria ; that the convenient term "membranous conjunctivitis" includes two distinct divisions, diphtherial and non-diphtherial, and that the severity of such cases in both types may vary from extremely severe, with loss of the eye, to quite slight conjunctival disturbance. He considers it is quite impossible to diagnose diphtheria accurately except by a complete and full investigation as above carried out.

Diphtheria of the Conjunctiva.—Mr. Sydney Stephenson read a paper based on the investigation of 43 cases of diphtheria of the conjunctiva, of which the following is a summary :—

Frequency.—Out of 3,412 patients seen in five years, 43 cases of conjunctival diphtheria were met with, making 1·25 per cent.

Sex.—Twenty-three cases were males, 20 females.

Age.—The youngest patient was 6 weeks old, the eldest 10 years ; 88 per cent. of all cases were under 4 years of age. The affection is therefore commonest in young children.

Season of Greatest Prevalence is during the first four months of the year, April being the most prolific ; just the time when ordinary diphtheria is most rife in London. From this Mr. Stephenson considers that croupous and diphtherial conjunctivitis are one and the same disease, and that both are equally related to the prevalence of faucial diphtheria.

Exposure to Infection.—Undoubtedly the conjunctival affection is due to infection from faucial diphtheria. Several cases occurred in the same family with, or in the neighbourhood of, true diphtheria cases. One instance was mentioned of three cases in the same family at different periods, the first in October, 1898, the second in October, 1901, the third in January, 1902. The intervals were long, but it was pointed out that Klebs Loeffler bacillus remains alive for a very long time—even for 351 days in gelatine, and diphtheria membrane, dried and kept in the dark, will produce cultures months later. Abel found the bacilli in a box of wooden bricks, with which a child suffering from diphtheria had played six months previously.

Previous Ailments. — Just as an unhealthy condition of the fauces favours ordinary faucial diphtheria, so a catarrhal condition of the conjunctiva paves the way for diphtherial invasion of that membrane.

Features of the Attack.—(*a*) Conjunctival diphtheria was associated with bad bodily health in 40 per cent. of cases. (*b*) Diphtheria of nose or fauces preceded the conjunctival affection once; was associated with it twice; and followed it once. (*c*) In all the cases except one the membrane was found on either the palpebral or ocular conjunctiva. (*d*) In almost all moderate or severe cases the pre-auricular gland and that at the angle of the jaw were swollen. (*e*) The character of the secretion was usually puro-mucus, with stringy threads between the lids on separating them. (*f*) One eye only was affected in 32 cases. Mr. Stephenson considers this a good clinical aid in diagnosis. (*g*) The inner surface of the upper and lower lids was usually coated with membrane; in only 4 cases was it found on the ocular conjunctiva, and never on the cornea; it was usually in streaks or patches, and was very easily wiped away when on the palpebral conjunctiva, but not so if on the ocular. (*h*) In 13 cases the cornea was hazy or ulcerated. (*i*) Result: recovery in 42 cases, death in 1. No single case was followed by peripheral neuritis.

Bacteriology.—Klebs Loeffler bacillus was found in every one of the 43 cases, in most instances associated with other bacilli, such as streptothrix, diplobacilli, and sarcinæ, but in 6 cases in pure culture. Mr. Stephenson considers the smear cover-glass preparation stained, to be a very reliable and rapid method of diagnosing the bacillus. Neisser's stain with methylene-blue was also a good method.

Treatment.—Antitoxin first of all, then the use of local antisep tics. The usual dose of antitoxin was from 1,000 to 4,000 immunisation units, according to the severity of the case. If the cornea was hazy, then a full dose was necessary. He recommends its use at once in every case, however slight, as faucial diphtheria is very apt to supervene. Locally, corrosive sublimate lotion applied by means of a small spray. In severe cases the lids were painted with potassium permanganate, or argent. nit. (2 per cent.).

The following reasons have induced Mr. Stephenson to look upon croupous conjunctivitis and diphtheria of the conjunctiva as being one and the same disease. (1) Both occur under similar general conditions as to the age and social state of the patients and the season of the year. (2) Mild croupous and grave diphtheria of conjunctiva are linked together by a continuous series of cases having intermediate grades of severity. (3) A croupous case may be preceded by, associated with, or succeeded by, diphtheria of the fauces, skin, &c. (4) Both affections are definitely and very greatly influenced by antitoxin, and lastly, the common contagium in the shape of the Klebs Loeffler bacillus lies at the root of both maladies. In only five cases has the writer seen membranous conjunctivitis not associated with the presence of Klebs Loeffler bacillus.

In the discussion which followed the reading of this and the preceding paper, Mr. Brewerton thought that Mr. Stephenson was apt to diagnose diphtheria in his cases rather too readily. He called attention to the fact that polar staining by Neisser's method was not nearly sufficient evidence, since it occurred with other bacilli.

Mr. Jessop said that many of his cases were not treated by antitoxin, since at that time it had not been customary to use it to so great an extent. He pointed out also that in the opinion of many bacteriologists it was absolutely impossible to make certain of the presence of the Klebs Loeffler bacillus by smear cover-glass methods or by any other; only by inoculation of guinea-pigs could it be made absolutely certain. He considered of greatest importance the fact that all the conjunctival diphtheria cases showed a well-marked clinical evidence of bad physical health, and urged that in every such case inoculation of a guinea-pig should be performed.

Mr. Stephenson stated that in all his cases he had not only done the bacteriological work himself, but had taken care to have it confirmed by independent investigators as well. Also he thought that in every case in which the Klebs Loeffler bacillus was not found, the whole investigation should be repeated several times if necessary. He pointed out that even in a case of true diphtheria the virus might be so attenuated as not to give any result when inoculated.

CLINICAL NOTES.

MOTAIS'S OPERATION FOR PTOSIS. — Although this method of relieving congenital ptosis does not appear to have been much adopted in this country, it is capable of giving excellent results. De Vincentiis (Naples) writes strongly in its favour, and illustrates his results in four cases by means of photographs. The essence of the operation is to employ a slip of the superior rectus to replace the weak levator; thus, when the patient innervates his elevator mechanism of the eye, he also at the same moment innervates the new elevator of the lid. The point of attachment ought to be just superior to the level of the opposite (normal) lid when the gaze is directed straight forwards or somewhat upwards. He has not been so well pleased with any method of operating as with this, regard being had both to appearance and function.—*La Clinica Oculistica*, September-October, 1901.

THE ADAPTATION OF ARTIFICIAL EYES.—In a certain proportion of cases after enucleation for various causes, there is considerable difficulty in the adaptation of the prothesis, on account of cicatricial bands in the subconjunctival tissue, injuries to the eyelid, &c. In some cases of such difficulty, Domec (Dijon) has found it to be of great advantage to take a cast of the orbit in order that an artificial eye may be made to fit precisely the irregularities shown by it. After experimenting with various substances without success, he has found that paraffin answers well. A suitable piece is heated to nearly melting point, and when just about to set, and while in a paste-like dough, it is packed into the orbit, which has been previously cocainised. After it has remained in for fifteen to thirty minutes the situation of the "pupil" is marked upon it, and it is removed; there is no difficulty in doing this. With this as a model, the optician has been able to form "eyes" which have been worn with every comfort by patients to whom the previous conventional eyes had given much, and long-continued, irritation. — *La Clinique Ophtalmologique*, November 25, 1901.

DIABETIC CATARACT.—Cataract affecting primarily the posterior pole and cortex is not uncommon in association with retinitis pigmentosa and other diseases of the pigmentary coat of the eye, but apart from these conditions, the presence of this variety of opacity of the lens is strongly indicative, according to Klein (Vienna), of the presence of some serious interference with proper tissue metabolism, and of all such alterations, by far most frequently of diabetes. The special form which the variety takes is that of a rounded central posterior polar opacity, along with the formation of striæ in the posterior layers of the cortex, these striæ being broad at the equator of the lens, with their apices pointed to the posterior polar region. These striæ become broader and broader at the expense of the intervening clear portions, and then the opacity spreads to the anterior cortical layers, and lastly the central portions become intransparent. Klein thinks that there is quite a sharp line of distinction into two classes of cataract in regard to this matter. In one, the anterior cortex is affected before the posterior; this is the ordinary senile cataract. In the other, the posterior cortex and pole are affected first, as described above; this is the form associated with choroidal disease and metabolic anomalies.—*Wiener Klinische Wochenschrift*, 45, 1901.

KRÖNLEIN'S OPERATION; SUGGESTED MODIFICATIONS IN ITS TECHNIQUE.—Pockley, in the *Australian Med. Gazette*, October, 1901, and Parinaud and Roche, in the *Annales d'Oculistique* for the same month, have reported two cases of orbital tumour operated upon by Krönlein's method. The procedure described in both papers differs in some respects from Krönlein's original description, and the modifications suggested are worthy of trial.

Pockley makes the skin incision curvilinear, beginning at the anterior limit of the temporal fossa, about half an inch above the orbital rim, and finishing on the zygoma, half-way between the external canthus and the tragus; the convexity of the curve is directed downwards and forwards. He considers this preferable to the usual incision, as allowing the flap to be easily turned upwards, out of the way of the operator. His other modification is to employ a small circular saw, attached to a dental machine, for cutting through the bones. This was found to be an easy and expeditious method of completing the bony incisions.

Parinaud and Roche describe a plan adopted by them, which they claim possesses distinct advantages over Krönlein's original method. They recommend the following incision. About the edge of the hair, in the pre-auricular and temporal region, a vertical cut is made, 5 cm. from the external border of the orbit, and 4 to 5 cm. in length. From the upper end of this, a horizontal incision is carried towards the upper-outer angle of the orbit, and curving slightly upwards in the direction of the eyebrow in which it terminates. Another incision parallel to this follows exactly the zygomatic arch and ends at the lower-outer angle of the orbit. The skin included between these three incisions is dissected up, exposing the temporal aponeurosis and the upper edge of the zygoma. All bleeding is arrested, and the remainder of the operation follows precisely the directions given by Krönlein.

The authors maintain (1) that their incision gives the surgeon much more room during the operation; (2) that the incisions are far enough from the conjunctival sac to exclude any risk of infection from it; and (3) that the cicatrices are scarcely noticeable, being largely hidden by the hair.

RESTORATION OF EYELIDS BY SKIN GRAFTING.—Adjemian, of Constantinople, writes in the *Archives d'Ophtalmologie*, December, 1901, giving his more recent experiences of Thiersch's method of skin grafting in operations for the restoration of eyelids. His observations were called forth by an article in the same journal in September, 1901, by Dr. Dupuy-Dutemps, who gave it his decided opinion that the Thiersch method of skin-grafting has proved a failure in cases of cicatricial ectropion, and that even in the most favourable cases the ultimate results were insignificant. He strongly advocated the employment of a skin flap with a pedicle.

Adjemian's original paper on this subject appeared in the *Archives* in August, 1897. At that time he had operated, by Thiersch grafts, on 42 cases; since then he has had 25, making a total of 67 cases of cicatricial ectropion treated by skin grafting, and with increasingly good results. In the last 25 cases there were 3 failures. He therefore warmly advocates the employment of Thiersch's skin-grafts in such cases, and gives a detailed account of the procedure he adopts.

The reviewer's experience, though limited, is decidedly favourable to Adjemian's contention ; indeed he thinks that in a fair proportion of cases of cicatricial ectropion Thiersch's is the only available plan, the skin in the immediate vicinity of the eyelids being so damaged as to be quite unsuitable for use in the formation of flaps. The experience of surgeons generally seems to be that it is advantageous to cut the grafts slightly thicker than Thiersch originally advised.

OCULAR COMPLICATIONS OF GONORRHŒA.—Lawford, in a paper dealing with the ocular complications of gonorrhœa other than purulent conjunctivitis, mentions the following as of more or less frequent occurrence in this connection : conjunctival inflammation (not due to contact), scleritis and episcleritis, iritis, irido-cyclitis and neuro-retinitis. When this form of conjunctivitis is present, the secretion is entirely free from gonococci, and the occurrence is regarded as "metastatic," but as Lawford points out, it is possible that it may be due to inoculation with virus, which from one cause or another has become attenuated. There is a close connection apparently between the articular manifestation ("gonorrhœal rheumatism") and iritis, but either may occur without the other ; each has a marked tendency to relapse. The other manifestations are very much less frequent.—*British Medical Journal*, November 2, 1901.

A NOTE ON THE VALUE OF THE FLUORESCEIN TEST.[1]

By Arthur H. Benson, Dublin.

Two compounds are in use, namely, fluorescein (uranin, sodic fluorescein $C_{20}H_{10}O_5Na_2$) and potassii fluorescein as ($C_{20}H_{10}O_5K_2$). The solutions of both of these exhibit intense yellow-green fluorescence.

It is now fourteen years since Straub[2] introduced fluorescein to ophthalmic practice as a means of recognising epithelial defects of the cornea and conjunctiva, and two years ago W. Bihler[3] claimed to have still further extended the diagnosticating use of fluorescein by making it available for the detection of incipient disease of the corneal endothelium at a stage when no evidence of sympathetic inflammation could be detected by any other means. He used, I believe, a 5 per cent. solution, after instilling cocaine.

Current English literature is very incomplete in its references to the action and diagnostic value of the fluorescein test. I may quote from one or two recent text-books :—

"To demonstrate the extent and presence of corneal ulcers, a drop of fluorescin solution may be put into the eye, and after two or three minutes, on washing away the superfluous reagent by boric acid, *the*

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[1] A paper read before the Dublin Ophthalmological Club, when the patients referred to were exhibited.

[2] *Centralblatt für Augenheilkunde*, 1888.

[3] *Münch. medicin. Wochenschr.*, 1899.

ulcerated surface will be stained a bright yellow-green" (Jessop, 1898).

"Fluorescein is used to make more apparent those spots upon the cornea that are *destitute of epithelial covering* (erosions and ulcers). If a 1 per cent. solution of potassium fluorescin is instilled into the conjunctival sac, and then washed out again with water, the highly fluorescent liquid penetrates solely into those portions of the cornea that are *unprotected by epithelium*, and such portions consequently are stained a vivid green. I use this method in clinical instruction, to make small *losses of epithelium more plainly visible*; but for the actual diagnosis of defects it is not necessary" (Fuchs, 1899).

"Any spot on the cornea which *has lost its epithelium* will be coloured a vivid green" (Fick, Zürich, 1896). And a footnote is added: "*Diseased epithelium* will also be coloured green, as, for example, the epithelium covering an eczematous pustule; but such a spot is only dull green, while a spot denuded of its epithelium appears to be saturated with a vivid green." Fick also speaks of the effect of fluorescin upon the conjunctiva *when denuded of its epithelium*, in which case a yellowish-green stain is produced.

"Minute abrasions and ulcers if suspected, and yet not determined, may be found by dropping into the eye a concentrated alkaline solution of fluorescin, which colours green that portion of the *cornea deprived of its epithelium*, while the healthy epithelium remains unaffected" (de Schweinitz, 1899).

Fluorescin "colours greenish-yellow that portion of the cornea *deprived of its epithelium*, while the healthy epithelium, or even that epithelium which is simply roughened and opaque, as in keratitis, remains unaffected" (de Schweinitz and Randall, 1899).

"A very beautiful method of ascertaining the presence and true extent of a corneal ulcer or traumatic loss of substance is the instillation of a 2 per cent. solution of fluorescein. Almost immediately after the instillation, the tissue forming the *floor of the loss of substance* assumes a greenish tint, which clearly differentiates it from the surrounding normal cornea" (Swanzy, 1900, 7th edition).

In all these, with the single exception of the footnote by Fick, no mention is made of the possibility of anything taking up the stain except an ulcerated or abraded cornea.

The text-books all seem unanimous in stating that fluorescein will stain all ulcers and epithelial abrasions, and that it will stain nothing else, whilst in practice I have found that it would *not* stain a great many conditions that are commonly called ulcers, but, on the contrary, would stain many corneas where there were neither ulcers, epithelial abrasions, nor any pathological condition of the epithelium discoverable by the eye, even when aided by a strong magnifying glass.

These considerations made me think it of interest to bring forward the subject, in the hope of obtaining, by experiment and observation, some more accurate ideas regarding its action and the interpretation to be given to those conditions in which a cornea stains with fluorescein.

I have heard it stated that only infective ulcers stain with fluorescein, and therefore that any ulcer that stains must be in an infective condition, and should be scoured, or cauterised, or otherwise treated by vigorous antiseptic means. Obviously this is too general a conclusion, and is not warrantable in view of the facts.

(1) I have found that, as stated by the text-books, fluorescein solution will stain corneal epithelial abrasions and ulcerations in an active state. In some

very sloughy ulcers of the cornea the stain produced is not green but yellow.

(2) But it will also, in many cases, stain the corneal epithelium for a considerable distance round the ulcers, as occurred in a case of dendritic keratitis which I tested a few days ago. By simple inspection with oblique light and a magnifying glass no visible defect of the cornea could be made out, except in certain limited areas, yet when fluorescein was put in, the green stain was visible far beyond the margins of the visibly affected areas.

(3) At times patches—quite localised patches—of the cornea will stain bright green, whilst to all other tests the whole corneal epithelium seems absolutely normal in polish and transparency; and this condition is not necessarily the forerunner of ulceration. I remember an old gentleman of nearly 70, who came to me with a corneal ulcer which stained freely. To my surprise I noticed that two other separate and sharply-defined patches on the cornea had also stained a bright green, though the epithelium was perfectly smooth, and before the fluorescein had been used there had been no visible pathological change in the cornea in those situations; and it remained perfectly smooth and transparent. Next day these patches appeared perfectly normal and would not stain, whilst other patches did stain that the day before had not stained. In no instance did these patches ulcerate.

(4) Epithelium of the cornea damaged by caustic alkalies, as ammonias, or by acids, or by direct heat, will stain beautifully, though the epithelium has not been abraded.

(5) The eyes of dead animals stain easily, even though the epithelium is not abraded.

(6) Normal corneæ of eyes which have had a good deal of cocaine or holocain instilled into them will stain all over in an unevenly mottled, dotted, and

streaked kind of way. Cocaine has a softening effect on the corneal epithelium (as is shown by the ease with which the epithelium can be brushed off a cocainised cornea as compared with one not cocainised), and if the eyelids of a cocainised cornea are held open for a few seconds, so as to allow the surface of the cornea to dry a little, it will be found covered over with minute pits and furrows (cracks perhaps in the epithelial covering), although no friction, other than that normally applied by the lid, has been exercised upon it. Such a cornea will stain easily though not densely. I take this to indicate that the cocaine has diminished the vitality of the epithelium.

(7) The damaged ocular or palpebral conjunctiva (as from caustics, &c.) will stain not green but a yellow colour, while most inflamed conjuntivæ, and the conjuntiva of chronic granular ophthalmia, even when scratched to bleeding point, will not stain. Nor will the raw surface after the removal of a scab in marginal blepharitis; though the edges of the skin round an inflamed eyelash will stain yellow. On the other hand, the roughened, partially opaque, and obviously pathological epithelium of chronic glaucoma or of typical interstitial keratitis will not take on the stain. I have never succeeded in staining the cornea in typical interstitial keratitis; it never does so unless the case is complicated by the presence of some other accompanying pathological condition of the cornea; nor will the keratitis of granular ophthalmia stain.

Many cases, too, of corneal ulcer will not stain, for instance the chronic ulcer of granular ophthalmia, though very recent ones will. As regards corneal ulcers and their staining with fluorescein, I am of opinion that those ulcers which do not stain are really those which are completely covered with a healthy, though it may be a very delicate, epithelium, for of course the epithelium spreads in from the edges and covers the whole floor of the ulcer as soon as the dead débris is removed, often long before the connective tissue has had time to fill up and make good the loss of substance of the true cornea, and it is one of the prettiest sights to watch, from day to day, in a healing corneal ulcer, the way in which the area that stains with fluorescein changes its shape and size as the epithelium encroaches upon and covers the eroded parts.

Bullæ of the cornea will sometimes stain, and sometimes they will not, nor is it very easy to say beforehand whether any given bullæ will or will not stain. Ordinary interstitial keratitis will not stain, as I have said, yet certain corneal conditions resembling interstitial keratitis will stain freely. Several such cases come to my mind. I have at present under treatment a girl, aged 27, who came with the history that the sight of her left eye got dim some two months previously, without any pain or redness, and from no known cause. It had gradually got worse, till on admission to hospital her vision was considerably diminished. There was absolutely no vascularity, no pain, no photophobia ; tension was normal, and but for the defective vision she would not have felt anything amiss with the eye. The cornea, however, was whitish in colour and looked as if there was a diffuse nebula over two-thirds of its surface. Careful examination showed a slight roughness or "ground glass" appearance over the whitish area, but the whole appearance was that of an entirely superficial opacity. Fluorescein solution, to my surprise, at once stained the whole of the whitish area, and this fact made me doubt the accuracy of the diagnosis of interstitial keratitis originally made. The case has since been under observation, and since admission some weeks ago the size of the staining area has steadily diminished, till at present it is only about one-quarter of its original extent, and there has not all through been the slightest vascularity or photophobia. [In some seven or eight weeks the eye entirely recovered and returned to its normal aspect.]

This case is, in my experience, a peculiar one, and I cannot regard it as one of true interstitial keratitis, but rather of a superficial keratitis, probably affecting only the corneal epithelium.

I have never come across any written description of such an affection, but another somewhat similar case was under the care of my colleague, Mr. Story. It occurred also in a young girl; there was absolutely no vascularity and the cornea was perfectly transparent, and yet fluorescein stained the epithelium (or at least what to the naked eye appeared normal epithelium) over about one-half of the cornea. In Mr. Story's case, as in mine, the cornea stained less and less till it finally ceased to stain at all, and all through the progress of the case there was no opacity of the cornea and no circumcorneal vascularity whatever. Another case was that of a soldier, in whom a superficial greyish opacity, very suggestive of interstitial keratitis, stained with fluorescein, but like the other cases noted (and unlike true interstitial keratitis), it rapidly mended without ever becoming very dense. I do not believe that any of these cases was interstitial keratitis, properly so-called, but that they were instances of quite superficial disease of the corneal epithelium, comparable to some diseases of the skin. All of them recovered so quickly and so completely as to exclude the diagnosis of interstitial keratitis, in my opinion. In my own case the intensity of the epithelial disease was sufficient to make the surface opaque, whilst in Mr. Story's case the transparency was not affected, though in both the vitality of the cells was affected sufficiently to allow the entrance of the staining agent.

I have seen some other cases which, while simulating interstitial keratitis, reacted to fluorescein in a way which made me doubt the accuracy of the diagnosis; and I should like to call attention to the above facts, in order that others may be on the look out for similar cases. True interstitial keratitis will not run the short, non-vascular course that these did.

W. Bihler two years ago stated that he had stained the corneal endothelium with fluorescein and thus was enabled to detect the first symptoms of sympathetic invasion of the uveal tract before any evidence of sympathetic ophthalmitis could be obtained by any other means. He instilled cocaine, I believe, before using the fluorescein; others have repeated his experiments. I have myself tried to stain the corneal endothelium, but have not yet been able to satisfy myself that I have succeeded, for in most of those cases in which I did not use cocaine I failed to obtain any stain, and when I used the cocaine I certainly got a stain, but found it impossible, so far, to determine whether any of the stain was really on the posterior surface of the cornea. I have not been able to get cases in the early stages when, perhaps, one might obtain more convincing results.

On this point I hold an open mind for the present, as my experiments were quite too imperfect to be relied upon.

In one case, indeed, I did succeed in getting a slight corneal stain without the use of cocaine; it was a case of irido-cyclitis with keratitis punctata. I have on several occasions stained it, and each time the stain was different in extent and situation. In no case have I been able to observe any stain whatever in the punctate deposits on the posterior surface of the cornea, though one would expect that either the spot itself or the endothelium in its immediate neighbourhood (being the most diseased) would take up the stain most readily; yet such I have never observed.

There is great difficulty in determining the depth of a faint corneal stain, and possibly the staining that I achieved may have been on the deep surface of the cornea, but I am by no means satisfied that it was so.

In any case the staining of the anterior epithelium, *if diseased*, will take place almost immediately on the application of the fluorescein solution, whilst the endothelium (if it stains at all) will not do so for a considerable time, as the fluorescein has to enter the anterior chamber before it can come into contact with the endothelium. That the endothelium of the cornea will stain with fluorescein I have demonstrated in enucleated eyes. I enucleated an eye with a transparent cornea, and having removed the contents of the globe, I made a scratch with a needle across the endothelial surface, and then put a drop of fluorescein solution into the anterior chamber. In a few moments I washed it out again, and found a slight diffuse stain of the whole posterior surface of the cornea, with the line which I had scratched with the needle rather less stained than other parts. A few minutes later the line scratched with the needle still remained rather less stained than the rest of the cornea, but on either side of it there was a narrow band of more deeply-stained tissue, as if the irritation of the scratch had been sufficient so far to impair the vitality of the cells in its immediate neighbourhood as to render them more susceptible to the entrance of the stain.

This experiment requires repetition for confirmation, but if true is interesting, as the changes occurred in the cells of a recently enucleated eye.

Wishing particularly to observe the effects of fluorescein on the damaged endothelium of the cornea, I made the three following experiments: First I passed a cataract needle through the cornea of a rabbit (under chloroform) and scratched lightly the posterior surface of the cornea; next day the cornea was very opaque over the scratched endothelium, and when I put in fluorescein, *at once* the whole opaque area of the cornea stained green, though the corneal epithelium was not abraded. So opaque was the cornea that I could not see its posterior surface.

In the second experiment I dropped cocaine into a rabbit's eye and a few minutes later instilled fluorescein. The cornea stained in an irregular, patchy way, but so far as I could make out the stain was entirely superficial.

Thirdly, I dropped fluorescein into a rabbit's eye in which no cocaine had been used, and again I got the cornea stained in a similar irregular, patchy way, and again the staining was superficial; if any deep staining occurred it was obscured by the superficial colouration. I do not think, therefore, that rabbit's eyes are very suitable for the investigation of the effects of the fluorescein stain, for the epithelium, even if perfectly sound, seems to take up the stain too easily.

The use of cocaine does certainly increase the staining power of fluorescein, and in more than one instance an ulcer which was plainly visible took on the stain very faintly or not at all before cocaine was applied, while after one drop of cocaine it stained perfectly, without any staining of the surrounding epithelium. I think, therefore, that we may conclude that when a cornea stains in whole or in part, the stained part represents either (1) an ulcer not yet covered with epithelium; or (2) an abrasion of epithelium; or (3) epithelium in a dead or diseased condition, though not necessarily in a dying state. The fact of staining is not therefore to be in all cases taken as an indication for active treatment, though such is often taught, for in many cases an ulcer which stains is nevertheless healing quite satisfactorily, and the fact of the epithelium taking on the stain is not an indication that an ulcer will certainly form.

REVIEWS.

ISCHREYT (Libau). On the Pathological Anatomy of Glaucoma Secondary to Subluxation of the Lens. *Archiv. für Augenheilk., Bd. xlii., Heft* 4.

ISCHREYT's paper is based upon the examination of an eyeball in which traumatic subluxation of the crystalline lens led to secondary glaucoma. The eye was excised twelve months after the injury. With the description of his own specimen, the author gives a useful abstract of previously reported cases, the number of which is surprisingly small. Including all cases of dislocation of the lens followed by glaucoma (not merely those of subluxation) he has found, in a search through the literature of the subject, only thirteen records in which the pathological conditions in the eyeball are described. He has excluded from his list all cases in which the displacement of the lens seemed to bear no causal relation to the glaucoma. In directing attention to the scanty literature and incomplete knowledge of this form of secondary glaucoma, Ischreyt mentions that although various explanations are offered, the views of previous writers as to the production of increased tension in these cases are all more or less conjectural. Indeed, the pathological conditions found are often so dissimilar that it is difficult to imagine any one explanation which will suffice for all cases.

In Ischreyt's specimen the conditions were briefly as follows: Before removal, the intraocular tension much increased, circumcorneal injection, cornea hazy, anterior chamber deepened, lens opaque, displaced backwards, markedly tremulous; sclero-corneal and ciliary regions thinned and staphylomatous. After removal and preservation in weak formol solution, examination revealed the following changes: the lens was displaced upwards and outwards; the zonula fibres were ruptured in the lower and lower-inner part, elsewhere intact; the ciliary body was generally atrophic, in the part corresponding to the ruptured zonula it was unusually vascular, while in other parts few or no blood-vessels were visible; the ciliary region, including the periphery of the cornea, was bulged in its whole circumference, the root of the iris atrophied, closely attached to and carried outwards by the staphylomatous sclera, and the adjoining portion of the iris (the "secondary iris-root") was displaced far forwards, in consequence of the staphyloma, and widely separated from the ciliary processes. Fontana's spaces and the plexus venosus ciliaris were nowhere recognisable; in the bulging sclera there were marked small cell infiltration and œdema around the blood-vessels, but posteriorly to this part nothing abnormal was detected. There appeared to be no interference with blood and lymph channels behind the ciliary region.

The author groups the cases of glaucoma following dislocation of the lens (fourteen in number, including his own) thus: (1) Those in which the lens was displaced into the anterior chamber (six cases); (2) those in which it was displaced into the vitreous (two); (3) those in which subluxation occurred (six).

In comparing his own case with those in group 3, he finds the pathological conditions differ materially, especially in relation to the part played by the lens in inducing increased tension. In the previously recorded cases there was evidence of narrowing or closure of the iris angle by pressure of the displaced lens; in Ischreyt's specimen, at least at the time of examination, this was not so, the anterior chamber being much deepened by reason of the bulging of the cornea and sclera. The thinning and stretching of the ocular tunics anteriorly were absent in the specimens reported by other writers.

The author is inclined to attribute the increased tension in his case to an anterior uveitis induced by the traction of the unbroken zonula on the ciliary processes, and leading to obstruction in the anterior excretory channels. The atrophic changes found in the ciliary body (except in that part corresponding to the ruptured zonula) were such as might well result from a chronic cyclitis.

It seems conceivable that this case is really closely allied to those previously described, and that the obvious differences in the pathological conditions were the result of structural changes induced by prolonged increase of tension. Ischreyt's paper is illustrated by three microscopic drawings.

J. B. L.

ERNST MARSCHKE (Breslau). The Pathological Anatomy of Myopia and Hydrophthalmos. *Klinische Monatsblätter für Augenheilkunde, September-October*, 1901.

In this paper Marschke brings forward fresh evidence in favour of the view advocated by Mauthner, Schnabel, Herrnheiser, and others, that the most important predisposing factor (apart from heredity) in the causation of myopia is to be found in an abnormal weakness of the sclera in the posterior segment of the eyeball. Marschke made very careful microscopic measurements of the thickness of the sclera at certain parts of the ocular circumference. Of the twenty-two eyes thus examined, six were emmetropic (one of them had slight hypermetropia), ten were myopic, five were examples of acquired hydrophthalmos, and two were from cases of congenital hydrophthalmos. A summary of the figures, which are given in detail in the paper, shows :—

(1) In the emmetropic group the thickness of the sclera increases steadily towards the posterior pole, where it attains its maximum.

(2) In the myopic group the sclera, while of normal thickness anteriorly to the insertion of the recti, becomes markedly thinned in the posterior segment, and is thinnest between the disc and the macula.

(3) In acquired hydrophthalmos the sclera of the posterior segment is normal, but the ocular coats are thinned in the anterior segment. In some cases the cornea alone appears to suffer from the distension.

(4) In the two specimens of congenital hydrophthalmos the ocular coats showed no thinning, and this condition appeared to Marschke to be best described as one of general "ocular giantism."

It is common knowledge that in high myopia associated with posterior staphyloma the sclera is greatly reduced in thickness, in extreme cases being no thicker than note paper at the posterior pole, and Schnabel has shown that in such a sclera there is "an entire, or almost entire, absence of the external fibre layers in the immediate vicinity of the optic entrance." Moreover, the investigations of Schnabel and Herrnheiser go to show that both the myopic "crescent" and the posterior staphyloma of Scarpa are developmental malformations, and are not the result of changes in normal choroid or sclera. In medium degrees of myopia, on the other hand, in which there is no posterior staphyloma, it has repeatedly been stated that the sclera was normally resistant. In this connection Marschke's measurements of the three first specimens in the myopic group are interesting. The degree of myopia was only 3 D., 3 D., and 4 D. respectively, but he found the sclera markedly thin in the posterior segment. In the emmetropic group the average thickness at the corneal margin (nasal side) was 0·5 mm., while at the fovea it was 1·01 mm. In the three cases of low myopia, while the average thickness at the corneal edge was the same as in the emmetropic group (0·51 mm.), at the fovea it was only 0·46 mm., less than half of the average in the emmetropic group. If these measurements are confirmed in eyes with a low degree of myopia the fact is a new and an important one. Congenital weakness of the sclera seems much more likely to be an effective factor in the development of myopia than the form of the skull, the shape of the orbit, the length of the optic nerves, and such like extraneous influences.

The measurements obtained in acquired hydrophthalmos are interesting in themselves, and are, moreover, indirectly confirmatory of Marschke's view that myopia of even low degree develops owing to abnormal thinness of the sclera in the posterior segment. In acquired hydrophthalmos the ocular coats yield where they are weakest, viz., anteriorly to the insertion of the recti and at the papilla. In myopia, whatever the *causa causans*, they likewise yield where they are weakest, viz., in the posterior segment.

The fact that Marschke found no thinning of the sclera in congenital hydrophthalmos is surprising, as it has been supposed that the enlargement of the globe in this condition is due to distention caused by increased tension. Marschke considers that the buphthalmos is not the result of tension, but that it is a malformation associated with increased tension.

For an interesting account of recent work on the anatomy of myopia, see Schnabel's article in Norris and Oliver's "System," vol. iii.

WALTER SINCLAIR.

BIALETTI (Milan). Ichthyol in Certain Forms of Trachoma. *La Clinica Oculistica, June*, 1901.

Among those who first employed ichthyol in the treatment of trachoma, if not actually the first, was Eberson. In 1896 he expressed the view that any application to be made use of with the view of removing trachoma, or of ameliorating the condition of the patient, ought to answer the following conditions: it must constrict the dilated vessels, remove the infiltration and thickening of the conjunctiva, and alleviate the various subjective symptoms, particularly the pain, lachrymation and photophobia. These conditions he found to be best met by ichthyolate of ammonia in 50 per cent. solution. Jacovides, who employed the drug tentatively in a great variety of affections of the conjunctiva, came to the conclusion that ichthyol was beneficial in practically every variety of inflammation of conjunctiva and lids; that its action upon inflamed tissue was chiefly due to its vaso-constringent and analgesic actions; that this beneficial effect was extended to all conjunctival inflammations except ophthalmia neonatorum, and that this influence was particularly noticeable in assisting the clearing up of pannus. Darier also advocated strongly the use of ichthyol, which had in his hands proved very valuable in the treatment of strumous lesions of the lids and cornea; he was strongly impressed with its beneficial action in any manifestation of the "lymphatic" diathesis. He used it without dilution, but from the account of some of his cases it would seem that it is better to dilute ichthyol to some extent.

According to Bialetti, Denti was the first to apply ichthyol definitely in the treatment of trachoma, and he considered it to be an application decidedly more suited to the acute than to the chronic forms. In particular, when superficial ulceration of the cornea is present along with the pannus, silver, copper, lead and zinc salts are contra-indicated. In place of lotions of corrosive sublimate or boracic acid, such as are frequently recommended in this condition, and decidedly superior to either of them, Bialetti advises ichthyol; in this he is at one with Eberson. The method of application which he has found most suitable is to evert the lid and very gently paint the exposed surface several times over with a solution of ichthyol (50 per cent.); this is then washed off with distilled water. Atropin may or may not be used at the same time according to circumstances.

When ichthyol was but recently introduced, Damiens asserted, as the result of his investigations, that it was anæsthetic in its action, and recommended its use subcutaneously for this purpose, but this view turned out to be quite an error; it calms inflamed tissue rather than renders it anæsthetic in any true sense. In fact, when it is applied in the manner just indicated, there is for a little time a feeling of burning, not at all severe it is true, but lasting about twenty minutes or so; if the condition of the conjunctiva is then tested it will not be found anæsthetised. Gradually this slight burning sensation passes off and the patient enjoys relief from the photophobia, blepharospasm and pain which the ulceration of the cornea had been causing. Unlike what is the case when certain other vaso-constricting substances are employed (such, for example, as suprarenal extract), this relief, which is to be attributed largely to the diminution of vessels, is permanent, and to this action is due also the clearing up of the corneal dimness which occurs, sometimes with considerable rapidity. As the vessels of larger calibre shrivel and the smaller ones disappear, the cornea begins soon to assume its more normal and transparent aspect. To the action of ichthyol as a deoxidiser of the tissues is probably due its influence in arresting the growth of micro-organisms rather than to any direct antiseptic influence. It is in the same manner probably, by reducing the food supply, that it diminishes catarrhal and other secretions.

Summing up, Bialetti expresses the opinion then, that ichthyol is of decided value as an antiseptic, which effect is produced by a reducing action upon those organisms which are apt to grow and flourish in the conjunctival sac, and that it is a useful agent for powerfully and permanently reducing the number and size of the vessels in the cornea in cases of pannus, diminishing the size of the vessels and curtailing the supply of pabulum for the maintenance of that inflammatory condition which keeps up the opacity of the cornea, and calming the pain which is so frequent and distressing an accompaniment of pannus when at all acute. Ichthyol is not a "cure" for trachoma, but a very valuable adjunct in treatment.

W. G. S.

AXENFELD AND SCHÜRENBERG. Congenital Affections of the Ocular Muscles. *Klinische Monatsblätter für Augenheilkunde, January and November,* 1901.

This subject is dealt with by the authors in three papers, whose extended titles are :—

(1) Congenital Affection of the Third Nerve ; Complete

Paralysis alternating with Partial Cramp; Monocular Spasm of Accommodation.

(2) Anatomical Condition of the Muscles in a Case of Congenital Defect of Abduction without Secondary Squint, and also in a Case of Congenital Defect of Upward Movement.

(3) Congenital Defect of Abduction Associated with Retraction of the Eyeball on Adduction.

These articles form a valuable addition to our knowledge of congenital abnormalities of the eye-muscles. The first of them deals with a case in which a total paralysis of the third nerve on the left side alternated every one, two, or three minutes with a condition of spasm affecting the levator, the sphincter of the iris and the ciliary muscle, also, though to a much less extent, the internal rectus, this being never sufficient to produce an internal squint. Whether the superior and inferior recti were also affected could not be ascertained. The monocular spasm of accommodation was observed by retinoscopy, and in this respect the case is unique. Even during sleep the rhythmical alternation of paralysis with cramp could be observed, the intervals then being lengthened to from two to five minutes. The patient, who was a girl, aged 6, was under observation for eighteen months, and, according to her parents, the condition had existed from birth. The rhythm of the cramps remained constant during any one period of observation, but varied somewhat from day to day, the intervals being rather longer when the child was tired.

Three similar cases have hitherto been recorded, one by Fuchs, the other two by Rampoldi. In one of the latter both eyes were affected, the spasm affecting alternately the right and the left. In Fuchs' case the condition was observed in a girl, aged 21, and had been noticed since the age of 2. Like the present case it was monocular, and in the intervals between the cramps the paralysis was complete.

The present is the only case in which monocular spasm of accommodation has been actually proved.

With regard to the causation of the condition, Fuchs considered a nuclear lesion more likely than a peripheral one. The present authors consider that the lesion was more probably at the base of the brain affecting one third nerve, the pressure of the tumour being such that the fibres of the levator and the internal muscles were more injured than those of the internal rectus. An erectile angioma might, they suggest, have been the cause, the tumour taking a certain time to fill with blood before the pressure became sufficient to open a vent—an abnormal valve, for instance,—by which it could empty itself; the sudden release of the nerve from pressure would then act as an irritant, causing spasm of those muscles supplied by the fibres which had remained functional.

The second article is a contribution towards our knowledge of the anatomical condition in cases of congenital deficiency of outward movement in one or both eyes without any secondary squint. In those cases in which the defect is confined to one side there may be parallelism, with binocular vision in all directions except that of the affected muscle itself. Three explanations of this condition are considered: (1) That along with a normal external rectus, normally innervated, a mechanical obstacle to external rotation exists in the shape of an abnormal band of fascia or connective tissue, connected with those bands which normally limit rotation; (2) that the external rectus is normal, but abnormally innervated, so that while its tonic contraction in opposition to the external rectus remains, no extra impulse to outward rotation can reach it; (3) that no external rectus exists, but in its place an elastic band sufficiently strong to oppose the internal rectus, but sufficiently elastic to allow of movement inwards when the internal rectus is in action.

As to the first of these explanations, it is negatived by the fact that in most of these cases there is no obstacle to a *passive* rotation of the bulb outwards by means of forceps.

As to the second explanation, it is not considered adequate by the authors of this paper. They relate, however, an interesting case in which a normal, but completely powerless, muscle was found. The case was that of a girl, aged 10, with both eyes directed persistently downwards, lateral movement being good, but upward movement altogether wanting. By means of a tenotomy in one eye, and an advancement combined with tenotomy in the other, a good position of the eyes was obtained. During the operation, the superior rectus on one side at least was seen to be normal. Yet no more power of upward movement existed after the operation than before.

The third explanation was found to be the true one in another case observed by the authors. A young man, aged 18, without any power of looking to the left with his left eye, but with complete parallelism in all other directions, desired to have his condition remedied. The conjunctiva was reflected to expose the recalcitrant muscle, and in its place was displayed a partially transparent, yellow-grey band, longitudinally striped, but neither like a muscle nor a tendon. When stretched it returned to its former position by its elasticity. As no operation would have been likely to improve the actual condition, none was performed.

In the third article the authors discuss the causation of those cases in which inward rotation is associated with retraction of the globe. There is always in these cases a complete absence of outward rotation, but only in some of them is there an internal squint on looking straight forwards. Inward rotation is generally defective in comparison with the sound eye. These cases now form a distinct group, as twenty-six of them have been published [*cf.* OPHTHALMIC REVIEW for 1895, p. 314 ; *Knapp's Archives of Ophthalmology* for 1900 ; and bibliography in article now under review]. Of these it is worthy of remark that eighteen were left-sided, two bilateral, and only six right-sided.

In the first of the three cases here narrated, there was, on looking straight forwards, no squint, but slight enophthalmos ; complete absence of movement of the left eye outwards, and defective movement inwards, associated with retraction to the extent of half a centimetre. If the look was directed either above or below the horizontal, the upward or downward direction was exaggerated in the affected eye. Passive movement inwards by means of forceps attached to the conjunctiva at the corneal margin caused no retraction.

In the second case (related in an appendix to the article), there was convergence of the left eye on looking straight forwards, complete loss of outward movement, and retraction of the eyeball, associated with defective inward movement. Here, too, passive movement inwards by means of forceps attached to the conjunctiva was easily carried out without causing any retraction. The result of a tenotomy of the internal rectus was completely to abolish inward rotation without doing away with the retractive movement associated with the effort to rotate inwards. At the time of the operation the external rectus was also searched for, and in its place was found a wide band of connective tissue containing no recognisable muscular tissue and only very slightly elastic.

In a third similar case there was only slight retraction on inward rotation, outward rotation being completely absent, as before. Here, the patient had had double senile cataract; successful extractions from both eyes produced a troublesome diplopia from which the patient remembered to have previously suffered in her youth. An examination of the external rectus, with a view of an operation for advancement, demonstrated an absence of muscle, and in its place a band of connective tissue as in the second case, only more elastic. Whether passive movement gave rise to retraction is not stated.

The anatomical condition demonstrated in these cases accounts satisfactorily for the absence of outward rotation, and so far these cases fall into line with that discussed in the second article, there being sometimes more and sometimes less of elastic tissue in the connective tissue band. The explanation of the retraction of the eye-ball associated with the action of the internal rectus is not quite so simple. Treacher Collins, in commenting upon one of these cases, says,[1] " I would suggest that, in addition to there being a congenital shortness of the muscle, and insertion of it too far back into the sclerotic, there is an absence, or insertion too far back into the walls of the orbit, of the check ligaments; so that the unrestricted muscular tone causes some permanent retraction of the globe, which is much increased on contraction of the unsupported muscle."

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[1] *British Medical Journal*, September 30, 1899.

Türk,[1] on the other hand, attributes these cases to the fixation of the eye-ball by the band of connective tissue which takes the place of the external rectus, and which, while preventing the internus from rotating it inwards in a normal manner, allows it to exercise some of its force in a movement backwards. This explanation Türk supports by experiments on the living subject. Fixing the conjunctiva on the outer side of the cornea with forceps, he found that in normal subjects the effort to rotate inwards caused retraction. This is the explanation which finds favour with Wolff,[2] who, in a recent article, furnishes proof that in one case at any rate it was correct. There was slight divergence in the position of rest, to remedy which he tenotomised the external rectus, or what stood in its place. The immediate effect was, besides overcoming the divergence, to do away with the retraction on inward rotation. As soon, however, as the band had had time to reattach itself, the condition was in every respect the same as at first.

A third explanation is based on the anatomical observations of Heuck,[3] who found the attachments of the recti muscles abnormally far back; and Bahr,[4] who, besides finding the attachment of the internal rectus to be unusually far back, discovered a separate bundle attached still further towards the posterior pole. In these circumstances the internal rectus, besides its normal action of inward rotation, would act as a retractor of the globe. This is the explanation which the authors of the paper now under review consider the true one in the first two of their cases, for in them passive movement inwards did not, as in Türk's case, cause retraction. In one of them, even immediately after division of the internal rectus, retraction followed the attempt at inward rotation, so that it would seem as if there must have been a separate strand of muscle such as Bahr found.

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[1] *Centralblatt f. Augenheilkunde*, 1899, p. 14.

[2] *Knapp's Archives* (English Edition), vol. xxix.

[3] *Klin. Monatsblätter f. Augenheilkunde*, 1879, p. 256.

[4] *Ophthalm. Gesellschaft in Heidelberg*, 1896, p. 334.

A. HUGH THOMPSON.

DUANE (New York). Anisometropia. *Archives of Ophthalmology, November*, 1901.

As the author says, there is considerable difference of opinion as to the proper treatment of cases of anisometropia; perhaps it would be more correct to say that there is considerable doubt sometimes as to the appropriate treatment of an individual case of anisometropia, for while all are agreed that the best thing to do is to correct each eye precisely, there is often hesitation with regard to the question of how that will be borne, and whether it would not be better to order a partially-correcting lens for one eye, rather than those which fully correct either. Duane gives a careful account of 39 cases, not enough, he modestly admits, to form the basis of a rule of conduct, but valuable as representing a series of unselected examples of this condition, and of the result of his efforts at full correction. For the principle which guided him was that in every case at least an attempt should be made to induce the patient to accept full correction before the assumption of an inability to wear such. His conclusions are interesting, though one may not altogether agree with each and all of them.

He finds that out of his 39 cases, full correction was "satisfactory" in 28; "unsatisfactory" at first, but becoming so later, in one; satisfactory for sight, but causing headache in one; satisfactory, but not worn, in one; satisfactory in itself, but could not be worn on account of diplopia due to muscular trouble, in two; temporarily unsatisfactory in two; uncertain in two; and unsatisfactory in two. On reading the extended accounts of the cases one feels that while an outsider might not perhaps take so roseate a view of the series, still there is nothing unfair in Duane's estimate. His main conclusions are somewhat as follows :—

(1) In the large majority of cases of anisometropia, even those in which the difference in refraction exceeds 2 D, the full correction can be applied with success, provided the patient is warned that it may take him one or two weeks to get accustomed to the glasses, and that during this period he must wear them steadily.

(2) In many instances temporary discomfort is produced by the glasses, but in the majority of such cases the discomfort soon disappears if the glasses are steadily worn.

(3) Such glasses often relieve important symptoms which glasses not compensating the anisometropia fail to relieve, principally headache and asthenopia.

(4) It is specially important to apply the correction when squint is commencing, which is evidently due to the anisometropia.

(5) The causes of temporary or permanent discomfort in using the glasses are: (*a*) The strength of the glass *per se*; (*b*) the unequal prismatic action of the unequally strong glasses, which gives rise to diplopia and confused sight, or to muscular asthenopia due to efforts to overcome the prism; or (*c*) to the presence of a muscular deviation producing diplopia. The glasses in this case, by increasing the distinctness of the double images, cause their presence to be more annoying to the patient.

(6) The statement that glasses correcting anisometropia give trouble by rendering the images of unequal size is probably fallacious.

(7) Anisometropia is frequently conjoined with muscular anomalies; in high degrees hyperphoria is apt to be present.

W. G. S.

PARSONS. Elementary Ophthalmic Optics. London: J. and A. Churchill.

Mr. Parsons is very much to be congratulated upon his exposition of Elementary Ophthalmic Optics. His apology in the preface for its production is amply justified in the succeeding pages; and many who are desirous to understand something of the mathematics of optics, but to whom the deeper depths and higher flights in the works of other writers are unattainable, will find here an atmosphere which can be breathed without undue effort; and which will act as a tonic to the portion of their intellectual centres involved. "This book is intended to supply the student of ophthalmology with all the optics which is necessary for an intelligent knowledge of his subject. The proofs are in some cases a little confusing at first reading, but they never demand more than a very elementary acquaintance with mathematics. Even where a trigonometrical nomenclature has been inevitable, the meaning of the signs is usually self-evident. Special care has been taken to emphasise all important propositions by italics, so that those who do not care to grapple with the proofs are provided with a readily accessible synopsis of results." We can cordially recommend the work.

DARIER (Paris). Ocular Therapeutics.

There are twenty-four lectures contained in this book, dealing chiefly, as the more extended title shows, with the more recent additions to the armamentarium of the Ophthalmic Surgeon in the shape of drugs, but to a less degree also with the more well known and long tried substances—such, for example, as are described by the author under the somewhat high sounding title of "that omnipotent trio—atropin, silver and mercury." The first ten chapters deal rather with the various drugs themselves, their mode of use, and the different conditions in which they are indicated, while in the remaining portion of the book the subject is looked at from the point of view of the diseases of different structures in the eye, and how they should be attacked. Naturally, in a work by Darier, subconjunctival injections of various drugs, and one or two substances such as dionine, occupy an amount of space entirely out of proportion to their merits in the judgment of others, but on the whole, the book is worthy of attention by ophthalmic surgeons.

PARIS SOCIETY OF OPHTHALMOLOGY.

NOVEMBER, 1901.

Staphylotomy.—M. Terson exhibited a patient, a girl aged 20, on whom he had performed this operation for the removal of an enormous unsightly staphyloma, the result of ophthalmia neonatorum, which had also been complicated by a secondary buphthalmos. In performing the operation, which he has done many times with uniformly good results, he is always careful to leave at least 2 mm. of cornea through which the stitches are passed ; in this way he is enabled to avoid all risk of interfering with the vitreous and of sympathetic ophthalmia ; the lens and remains of iris are gently turned out and the wound sutured. The needles are not passed into position before the abscission of the staphyloma, for no needles are capable of keeping back the vitreous, should it show any disposition to escape, while the approximation of the lips are apt to be less accurate, and the lens is apt to be dislocated if an attempt is made to do so. It appears best to use a thread armed with two needles, which are passed from within outwards, they can thus be inserted without loss of vitreous, should it be fairly consistent. Three such stitches are generally placed. In the case shown, as in a large number of such, the vitreous was quite fluid, but there was no detachment of retina whatever, a fact which is worth noting in connection with the patholcgy of that condition.

Facial and Conjugate Lateral Paralysis.—MM. Péchin and Allard exhibited a patient, a woman, aged 46, who presented a complete left facial paralysis, affecting even the brow on that side, along with complete inability to move the eyes beyond the middle line to the left ; convergence, however, was preserved. She had other visual symptoms as well, such as interference with colour vision and monocular diplopia. In spite of the lagophthalmos she had not suffered from any exposure ulcer ; the cornea was not insensitive. Although the patient certainly had some hysterical symptoms besides, it was considered impossible to regard the condition as hysterical altogether, and although the completeness of the paralysis of the seventh nerve might appear in favour of a peripheral situation of the lesion, absence of the reaction of degeneration after a year and a half was distinctly against such a theory, and there was no neuralgia, such as so frequently accompanies a peripheral paralysis. A central situation of the lesion is almost negatived by the absence of hemiplegia, as well as by the completeness of the facial paralysis, nor would the facts agree any better with a cortical lesion. The authors were therefore driven to conclude that the lesion must lie in or about the corpora quadrigemina ; a lesion in such a position would also explain the associated lateral paralysis, the " horizontal hemiophthalmoplegia," to use the happy phrase of M. Brissaud.

The Unit of Measurement of Visual Acuteness.—M. Sulzer, in a very long paper, advocates the adoption of the "grade" as the appropriate standard. It has been proposed, and the method indeed adopted, by surveyors in the army, to divide the circle into four, and each of these four into 100 grades in place of 90 degrees, in order to bring the calculation of time as well as space under the decimal system. Sulzer wishes the visual acuteness to be calculated in terms of such grades.

CLINICAL NOTES.

ACCIDENTS IN AERATED WATER FACTORIES.—By direction of the Home Secretary, Mr. Snell (Sheffield) reported upon the face-guards which manufacturers are obliged to provide for such of their employees as are exposed to risk from bursting of the bottles. In certain of the factories precautions had been somewhat neglected, or the appliances provided have been unsuitable ; and in others the workpeople refused to wear them on account of the injury to sight which they supposed the wire gauze had caused or might cause. Careful examination into the question, however, clearly showed that this impression was without foundation, provided the mesh was of suitable size ; no instance was found in which there turned out to be real ground for attaching blame to the gauze screens. While of course injuries to the eye are among the most serious which occur in such an occupation as that of a worker in an aerated water factory, Snell reported that eye goggles did not afford sufficient protection, and advised shields covering the whole face and neck, both because he learned of accidents in which such goggles were dashed aside by the impetus of a flying piece of glass and the eye injured, and for fear of injury to other parts of the face and neck. One case came to light in which a severe cut of the neck had proved fatal. It is not wise to have the wire netting of too coarse a mesh, for two instances were found in which the eye was injured by a fragment small enough to pass through the mesh. It must be borne in mind too that it is not merely the individual in whose hands the burst takes place whose person is in danger. Many accidents have occurred to other workers in the neighbourhood, or even to some one who happened to be passing by. To minimise this danger the charging machines, &c., are, at least in some of the factories, hedged round most carefully by guards in every direction. The number of accidents, slight or severe, which occur, is very large; thus he was informed by a large firm employing 2,500 hands in winter and 4,700 in summer, that during one year nearly 400 accidents took place. But then, the bottles burst with terrible frequency whether when being filled, wired, labelled, or what not. He was told that about one per cent. of breakages is not an exaggerated average estimate, taking new and old bottles; new bottles burst much more readily than old ones. One firm took special notes for a single day and found that four syphons burst out of 1,800 filled on that day, and 740 bottles out of 400,000.—*Report furnished to the Home Secretary.*

Bi-focal Lenses.—Bi-focal lenses have, as everyone knows, been in use ever since their invention about 1770 by Benjamin Franklin, but they are not at all times a great success. At first they consisted simply of two glasses inside one spectacle frame, divided by a horizontal line, the upper part consisting of the distance correction, the lower, of the reading glass. The chief objections to these glasses are that while they may be comfortable enough so long as the patient sits still, when he walks all objects in the lower (and more important) portion of the field of vision are more or less indistinct, which is very inconvenient when the wearer is descending a staircase, for instance; and, especially should the lenses be at all powerful, the interface gives a troublesome reflexion. Matters are therefore improved by making the reading glass more nearly circular and extending the distance glass to some extent round it at the two sides, for this gives an enlarged field of vision, and by making the reading glass in the form of a supplement to the continuous distant-vision lens, representing merely the *additional* strength needed; it could thus also be made so thin at the edges as almost to present no interface. Weeks proposes to modify this plan still further by making the additional lens or "paster" as it is called, much smaller in size and of oval shape; it is affixed to the large correcting lens for distance in such a manner as to leave a margin all round, thus ensuring a field of corrected vision even directly below. He has himself worn such glasses with perfect comfort, and so have some of his patients.—*New York Medical Record*, August 24, 1901.

The Optical Influence of Extraction of the Lens.—Landolt's method of calculation of this question is as follows: $l'' = \frac{F' \times F''}{l'}$; l'' being the difference in length between the ametropic and the emmetropic eye; l' the focal distance of the correcting glass placed at the anterior focus; and F' and F'' the principal focal distances. The value of l' in dioptres is $= \frac{1\text{ Metre}}{l'}$.

If $l'' = 1$ m., l' becomes equal to $F' \times F''$, which in the complete eye is 321 mm. Therefore $\frac{1}{l'} = \frac{1000}{321} = 3$ D. (approx.)

But in the aphakic eye $F' \times F'' = 721$ mm.; in it therefore $\frac{1}{l'} = \frac{1}{721} = 1{\cdot}4$ D. (approx.) or almost exactly the half of its value in the other. That is, a difference in length of the complete eye has about double the optical effect which it has in the aphakic; in the former 1 mm. has a value of 3 D., in the latter of only 1·5 D. On the other hand, a difference of 1 D. in the correcting glass of the aphakic eye indicates about double the difference in length which it does in the complete eye. To give a concrete example: increase in the length of a complete eye by 2 mm. would give a myopia of $(3 \times 2 =)$ 6 D., but the same increase in an eye after removal of its lens would not give $(11-6=)$ 5 D., but $(11-3=)$ 8 D. According to Landolt, then, we cannot expect to obtain emmetropia by extraction of the lens for a myope unless his myopia is at least 20 D. This, it may be pointed out, is not strictly in accordance with clinical facts. Though Landolt appears, to judge from certain incidental expressions occurring in the course of a purely mathematical article, to be sceptical as to the propriety of operating for myopia, he sums up his calculations by giving a very simple and useful formula by which to estimate the optical effect; thus: call the correcting glass of the complete eye c, and that of the aphakic eye a, then $c = 2\ (a - 11)$; or $c = 2a - 22$; $a = \frac{22+c}{2}$ or $a = 11 + \frac{1}{2}c$.

Thus if one finds a patient's myopia to be represented by a lens (in the usual position) of —24 D., after extraction his correction may be expected to be $(a) = 11 + (\frac{-24}{2}) = 11 - 12 = -1$ D.—Knapp's *Archives of Ophthalomology*, September, 1901.

THE VALUE OF TRIKRESOL AS AN ANTISEPTIC IN OPHTHALMIC PRACTICE.

By Edward Jackson, M.D., Denver, Colo.

The writer's attention was first called to the value of trikresol in ophthalmic practice by the article of E. A. de Schweinitz in the *Therapeutic Gazette* for July, 1894. He found by a series of experiments that the solution of 1 part of trikresol in 1,000 of distilled water was a reliable antiseptic, and was not irritating to the eye. He recommended the use of such a solution as the basis for the collyria used in the eye, to prevent their contamination by bacterial growths. Three years later in a paper read before the Section on "Ophthalmology of the American Medical Association" at its meeting in Philadelphia, and published in its *Transactions*, p. 104, de Schweinitz contributed further evidence of the value of his earlier suggestion. The solutions he had experimented with had been set aside in loosely corked bottles, and after the lapse of three years were found still free from bacteria.

Beginning with using the trikresol solution as the basis for collyria, the writer has since found it valuable in a considerably wider field. It does not constitute an ideal antiseptic solution, but comes nearer to the ideal than any other solution yet tried in ophthalmic practice. Without further bacteriological experiments to test its antiseptic powers, there has been no

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apparent reason to doubt the correctness of the results arrived at by de Schweinitz, regarding its bactericidal influence.

Freedom from Irritating Properties.—The 1 in 1,000 solution is certainly less irritant than 1 in 10,000 solutions of mercuric chloride or of formaldehyde; and no patient has been encountered who presented any idiosyncrasy toward it that lessened its applicability. Instilled into the conjunctiva it causes a very slight momentary sensation of burning. Simple solutions of cocaine and of eserine commonly cause quite as much complaint. Solutions of each of the mydriatics (made probably from samples of the drugs that were not perfectly neutral) have caused much more complaint than does the trikresol solution.

Basis for Solutions.—The 1 in 1,000 solution of trikresol has therefore been used as the basis for solutions of cocaine, eserine, most of the mydriatics, and even the boric acid solution in some cases. The writer does not use it for holocaine, believing that it in 1 per cent. solution is sufficiently bactericidal to take care of itself. It has not been adopted for solutions of homatropine; because when repeated instillations are to be made, especially in the eyes of children and sensitive adults, even the slight sensation and increased lacrymation it causes are positive objections. From the best specimens of homatropine hydrobromate a perfectly non-irritant solution can be made with distilled water. Such a solution is commonly freshly made, at short intervals, and used in eyes having sound corneal epithelium; so that there seems no need to complicate it by the addition of any antiseptic. The same remarks apply largely to atropine solutions, used to maintain cycloplegia in cases of strabismus.

While the above use of trikresol has developed no reason for scepticism as to its reliability as an antiseptic, the writer has not yet been willing to rely upon it wholly in connection with capital operations. The solutions of cocaine, eserine or atropine to be used in cataract operations are still freshly boiled. The importance of the results involved in such operations fully justify a doubling of precautionary measures.

An Antiseptic Wash.—The history of the use of chemical antiseptics in the conjunctiva is a history of unfulfilled hopes. The writer has employed the bichloride, cyanide and iodide of mercury in various strengths, and has made various attempts with formaldehyde. But in the end he came back to washing the conjunctiva with distilled water, physiological salt solution, or freshly sterilised solution of boric acid, convinced that these were equally reliable and decidedly more agreeable.

The history of boric acid solution in this connection is interesting and instructive. Every experimenter for years has demonstrated, that as an antiseptic it is practically worth no more than so much distilled water. All have seen the luxuriant growth of low vegetable forms in bottles of the solution. And yet it still continues to be more used for a cleansing collyrium than any other preparation. The reasons for this seem to be: It does not violate the first indication regarding all treatment—not to make the patient worse; and that no other preparation that had been generally tried for such purposes had a clear record in this respect.

From a general use of trikresol as a cleansing solution, extending over more than two years, it seems:—

That it is free from risk of making the eye worse in any respect.

That it is an antiseptic solution that will at least keep itself clean.

That it has a distinctly germicidal influence when used to wash out the conjunctiva.

While the solution of 1 in 1,000 has a very noticeable smell of trikresol, this smell does not remain noticeable about the patient on whom it has been used. In all respects it seems superior to carbolic solutions to lay instruments in, to keep them from contamination after cleansing. It is superior to formaldehyde solutions for this purpose, because there is no need to remove a source of irritation by rinsing the instrument coming from it in something else before using it upon the eye.

REVIEWS.

FUCHS (Vienna). Detachment of the Choroid after Operations. *von Graefe's Archiv für Ophthalmologie, lii.*, 3.

BIETTI (Pavia). Detachment of the Choroid after Operations. *Annali di Ottalmologia, xxx.*, 10-11.

It appears that Knapp was the first to diagnose detachment of the choroid after extraction of cataract so long ago now as 1868, but until the present the subject has been rather neglected, and few articles have been written dealing with the question, or cases in point recorded. In 1900, Fuchs published a paper dealing with the matter, in which, after recording a few cases with which he had met, he pointed out the probability that the disease was not quite so uncommon as the lack of literature might seem to suggest. To test the question he made careful investigation in the cases of extraction of cataract or iridectomy during the year ending July 31 last; not every case of these operations was subjected to ophthalmoscopic examination, it must be noted, but those only in which there appeared to be some ground for suspecting the possible presence of this condition. The symptom considered to be suspicious was either the emptying of a re-formed anterior chamber or its failure to form at all. In many of these cases an evident, unequivocal detachment of choroid could be made out; in a number of other cases detachment was probable, but could not be diagnosed with such absolute certainty, either because it was so slight, or on account of the difficulty of ophthalmoscopic examination from the presence of lens matter or of blood, so these have been left out of account; in his calculations as to the frequency of the condition only unquestionable cases have been included. It might perhaps be thought that repeated and sometimes prolonged ophthalmoscopic examination of an eye only two or three days after extraction of cataract might prove harmful, but Fuchs has never seen any evil result, and finds in this fact a confirmation of the recent teaching, that the restrictions formerly placed upon cataract patients in the matter of moving about, &c., are really unnecessary. (Fuchs allows his patients to be up from the day following the operation.) It then became manifest that detachment of the choroid was far from being so exceptional a condition as was supposed, nor is it at all difficult to diagnose; the detachment can sometimes even be seen by means of focal illumination.

The cases naturally fall into two groups—those following extraction, and those following iridectomy simply. Of the extraction patients during the year, detachment of the choroid occurred 14 times among 318 extractions without iridectomy, or 4·5 per cent., and 9 times out of 175 extractions without iridectomy, or 5·1 per cent. These numbers are certainly not sufficiently large to enable one to predicate any greater liability after one mode of operation than after the other. Fuchs' practice is to omit the iridectomy in entirely uncomplicated cases. Out of the cases following extraction by either method (23), the operation went quite smoothly in 17, in 4 there was some loss of vitreous, in 1 case the lens was removed in its capsule, but without any loss of vitreous, and 1 was the extraction of a lens dislocated into the anterior chamber, tension being increased at the time of operating. In about a fourth of the cases, then, there was one complication or another.

In one instance both eyes of the same patient were affected after double extraction.

Fourteen instances of detachment of choroid occurred after iridectomy; 9 of these followed iridectomy for acute glaucoma, and 2 iridectomy for glaucoma simplex; in 2 instances the incident took place in both eyes of the same patient. Some of the iridectomies were performed with Graefe's knife, some with the keratome; in only one of them was there any complication, the wound gaping immediately after operation as though a deep hæmorrhage had occurred; but even in this instance sound, though delayed, healing took place. Besides these cases of primary glaucoma, detachment of choroid occurred in 2 cases of iridectomy on account of secondary glaucoma, and in one on account of chronic iritis with closed pupil in which the tension was not at the moment of operation increased. These 11 cases following operation for glaucoma form 10 per cent. of all the iridectomies done on account of glaucoma in the year, a proportion which forms a marked contrast to the cases of cataract. Fuchs has not so far met with this detachment after linear extraction, of which of course iridectomy forms no part. It must be borne in mind at the same time that on account of the impossibility of a thorough ophthalmoscopic examination cases may be missed after optical iridectomy or operation for closed pupil.

Certain points in regard to the "dangerous" class of cases may be emphasised:—

(1) The more advanced age of the patients suffering from cataract and glaucoma, and the consequently greater rigidity of the sclerotic. In such a case, when the aqueous humour escapes, either air must enter the anterior chamber, the cornea sink in, or the globe shrink slightly as a whole. But it has been shown that the choroid possesses a certain degree of elasticity, and even of contractility; it is therefore possible that the choroid may tend to draw itself together and cause the vitreous to come forwards; the rigid sclera is at the same time unable to adapt itself to these changes of position,

and negative pressure tends to be established between choroid and sclerotic. Should there then be any aperture of communication between the anterior chamber and the subchoroidal space, such as might be caused by a slight tear or gap in the ciliary region, the aqueous humour will at once pass behind the choroid. This may to some extent explain the occurrence of detachment of the choroid, but it will not account for the manner in which it bulges forwards into the vitreous.

(2) The use of the Graefe knife in making the incision. By its means the incision in the sclera is made from within outwards, and the tissue raised slightly upon the edge of the knife ; in this way a minute rent may readily be made in the region of the base of the iris and ciliary body, especially if, as in the glaucoma cases, the pupil is at the same time contracted under pilocarpin. It must, however, be observed that in a certain number of the cases a Graefe knife was not used.

(3) The previous increase of tension (in the glaucoma cases).

The principal symptom which draws the surgeon's attention in these cases, is, as has already been said, that the anterior chamber, which had re-formed after the operation, is discovered to be again absent. Only in one of his cases did Fuchs find that any evidence existed of a knock or other external injury to the eye. In a few of the cases a little blood was found in the anterior chamber, but the patients, even in these instances, had complained of nothing, and in the most of them there was no indication that the external wound had given way. In about half the cases the chamber was not empty, but merely shallow, when the dressing was taken off, though of course things might have been different some hours previously. In a few cases the anterior chamber had never formed soundly after the iridectomy for glaucoma when the detachment was found. In the majority of the cases the detachment could be seen with the ophthalmoscope on the occasion of finding the shallow chamber, but in a few the condition could not be seen till the following day.

It is between the second and the eighth day after operation that the detachment seems to occur, but when blood or cortex is lying among the aqueous, the diagnosis is of course more difficult, and it may have occurred earlier in a larger proportion of the cases than the statistics would seem to suggest. One of Fuchs' cases was peculiar in this respect, that the detachment did not come on till the sixteenth day ; it was the case of extraction of a dislocated lens from the anterior chamber. In fully two-thirds of the present series the diagnosis was first established with the ophthalmoscope, but in the remainder the detachment was even at the first examination so prominent that it could be seen by means of focal illumination, and in some of the cases it was quite certain that a very large increase in the degree of detachment took place within the space of a few hours. As a general rule, the detachment, if slight (*i.e.*, shallow, flat) when first seen, remained so, and did not encroach much upon the vitreous area, but in one or two cases the development of a more severe detachment could be watched. Sometimes the disappearance of a detachment, as well as its development, was very rapid ; in two cases a very large separation vanished almost between one day and the next, but as a general rule the change was less rapid, and coincided pretty exactly with the re-establishment of the anterior chamber and the rise of the tension to the normal standard. This was not invariably the case, but for the most part the detachment was gone by the time the anterior chamber and the tension were normal again. In the majority of the cases the detachment ceased to be observable by the second day after its onset, but in one case it lasted for thirty days. It is of course manifest that when the lesion is at its height, vision is very seriously interfered with, and the field of vision is restricted in a manner corresponding to the detachment. The prognosis appears to be quite good in all cases as regards restoration of sight.

A flat detachment may readily escape detection, for it has almost exactly the same colour as the normal fundus, unless one catches sight of its posterior edge, which appears as a dark curved line; at this point the retinal vessels are bent, alter their level, and show parallactic movement. If one's gaze during the examination travels too rapidly towards the periphery, the condition may easily escape detection, as beyond this curved line the fundus again acquires its normal colouration. No such difficulty attends the diagnosis in the case of the more bulging attachments, whose surface is smooth, but when the tension under the detached portion is low, and the membranes lie flattened and in folds, it may readily be mistaken for detachment of the retina. Sometimes these folds are numerous, and concentric with the curved margin, showing as dark shadows alternating with more normal looking red, the retinal vessels exhibiting clearly the varying levels. These folds were to be seen chiefly in the recent cases, according to Fuchs, and sometimes altered their appearance from day to day as the case advanced.

As a rule, Fuchs found the detachment to be either at the temporal or the nasal side of the fundus, and about equally frequent in the two situations, or at both at the same time; when this last was the case, the separation was usually more marked at one side; detachment either above or at the lower part was much less frequent. Detachments either above or below were always shallow, often thrown into folds and without sharp contour, and were invariably associated with much more decided lateral detachments.

With the view of investigating the pathology of the condition, Fuchs carefully examined the eyes which he was able to obtain in nine persons who "happened" to die shortly after extraction of cataracts; out of these nine eyes, four showed detachment of the choroid, and of these four he describes carefully the pathological condition. Into the precise details we need hardly enter, the essential facts, however, were that there was a flat detachment, caused by a pure serous fluid, which lay between the layers of the suprachoroidea, and that a rent existed in the fine tissue of the angle of the anterior chamber, with no detachment of the retina. His opinion is that the fluid detaching the choroid is the aqueous humour, and that the opportunity of its reaching the subchoroidal area from the anterior chamber, is afforded by the presence of the rent in the root of the iris at its junction with the ciliary body, a condition which was found in all these four cases. In the third and fourth of the cases the detachment extended backwards to a point about 10 or 12 mm. from the disc, to a point, that is, exactly agreeing with the place of exit of the venæ vorticosæ, which, as they pass through, firmly fix the choroid to the sclerotic. If into a dead eye one injects paraffin or other fluid between the choroid and the sclera, that is the posterior limit of the passage of the detaching fluid. In another case, not included in the above four, in which there had been a trauma and subsequently inflammation of tissues, and which case therefore, presented certain peculiar features, the detachment extended further back, but had evidently taken place under greater pressure, and the veins were partly torn, blood being mixed with the detaching fluid.

One word is necessary regarding the contrast between this condition and other forms of separation of the choroid. It will be seen that this post-operative variety of detachment of the choroid is entirely distinct from that other form, which is apt to come on as the indirect result of severe inflammation, whether of traumatic or of spontaneous origin; the detachment in such a case is quite frequent in atrophic eyes, and is due to traction exercised upon the choroid, partly through inflammatory membranes of varying tenacity, which are adherent to the ciliary body, partly to the detached retina, which by means of the ora serrata drags upon the choroid. This detachment is also apt to have its line of cleavage at the true anatomical definition of choroid from sclera, rather than through the lamina suprachoroidea; the fluid behind is serous, being the expression of a negative pressure, and detachment of the retina is an invariable accompaniment.

A third group of cases is formed by those in which a large hæmorrhage has occurred between choroid and sclera, either during an iridectomy for glaucoma, or as the result of a trauma. The presence of this blood is apt to set up inflammatory reaction in the neighbouring tissues at a later date, which causes the choroid to become separated from the sclera; detachment of retina may or may not be present.

A fourth variety may occur, but is very rare; sub-choroidal extravasation of pus or blood may occur in the course of metastatic choroiditis. Such exudations are common enough from the superficial layers of the choroid, between it and the retina, but not between choroid and sclera; still they do occur now and again.

Bietti, in his paper, gives references to all the important papers published on the subject.

W. G. S.

PANAS. Epibulbar Tumours of the Sclero-Corneal Limbus. *Archives d'Ophtalmologie, January*, 1902.

In this article the author deals exclusively with the important subject of malignant epibulbar tumours. After defining what is meant by the term epibulbar tumour and enumerating the different benign varieties, he describes a striking example of malignant epibulbar tumour which serves to make more readily understood the views which he holds as to the actual origin, nature, prognosis and treatment of this kind of tumour.

In this case, a female, aged 61, the tumour, which was situated at the inner part of the sclero-corneal margin of the right eye, may possibly have originated from the circumstance that a piece of coal became embedded in the conjunctiva at the age of 19. A red mass the size of a pin's head appeared six years later, at the age of 25, and slowly increased for eight years, until the age of 33, without any change of colour, attaining the size of a small pea. It was then excised. Although excision was incomplete, the small mass remained stationary for ten years, and it was not until the age of 59 that it was again excised without subsequent cauterisation.

A second recurrence took place from four to six months after this, which differed from the first in that the tumour became more voluminous and entirely pigmented. When seen by the author in December, 1900, the following was the condition: the tumour was black and composed of four lobes of unequal size; the base encroached on the cornea for a distance of 2 or 3 mm. and extended over the sclerotic very nearly to the plica semilunaris; it was the size of a filbert. A hemispherical swelling the size of a small cherry stone at the inner part of the lower fornix was thought to be a fifth lobe of the tumour, unless it was produced by a neoplasm proceeding from the ciliary body. But as the cornea external to the tumour was normal, as well as the iris, media and retina, this was not probable, especially as the field of vision was normal and V. = $\frac{1}{3}$. The operation, excision followed by cauterisation, confirmed the diagnosis and it was seen that the tumour was only attached to the sclero-corneal limbus and that none of the five lobes had involved the eyeball. Notwithstanding the long duration of the growth of the tumour (thirty-six years), and two incomplete excisions, which only tended to aggravate it, the globe remained intact and there was no extension of the growth towards the interior of the eyeball, an important point also demonstrated by several analogous cases. Its structure was identical with that of two cases of epithelio-sarcomata from Panas' clinic which are also recorded in this article.

Since Panas published his account of the pathological anatomy of epibulbar tumours in his treatise on "Diseases of the Eye," vol. ii., the subject has been taken up by Lagrange, Lemelettier and others; unfortunately in many cases the diagnosis has not been confirmed by a detailed histological examination. Therefore the author collected other sixteen cases, but for the same reason he only retains four of them; these, however, strengthen the view that malignant epibulbar tumours are usually of an epitheliomatous nature. But before deciding the question of what is the usual structure of these growths he relates a number of cases apparently in favour of their sarcomatous nature.

Although these neoplasms may be situated at any part of the bulbar conjunctiva, in the majority of cases they have their origin at the sclero-corneal limbus, and especially in the part of the limbus which corresponds to the palpebral fissure—most frequently at its temporal part. Thus of sixty-seven cases where the origin is specified, forty-one were on the temporal side, seventeen on the nasal side, one on the lower and two on the upper part of the limbus. These tumours are not all of the same colour, some are black, others red, or yellow-grey, and the several parts of the same tumour may be differently coloured. Nor is their consistence uniformly the same, for some are soft, others firm, as if fibrous, and others are of intermediate consistence; the tumour is always firmer at its sclero-corneal attachment than at the surface.

These morbid growths are at first smooth and flat, but may become lobulated; exceptionally they arise from two or three small adjacent lobules. Their progress is usually so very slow as sometimes to extend over several years, as in Panas' case, unless they are irritated by incomplete excision, accidental wounds, or by intercurrent conjunctival inflammation. A certain number of cases are attributed to injury. They occur in adult life, from 40 years upwards.

It is very remarkable that the tumour at first develops exclusively in conjunctival tissue, which in this situation forms a species of frame for the cornea, like the setting of a watch glass. This part of the conjunctiva has a special structure and also adheres firmly to the episcleral tissue and so to the edge of the cornea and subjacent sclerotic. Only after a very long time do the superficial layers of these two membranes become invaded by the growth. Perforation of the globe by the neoplasm is very exceptional. It is necessary to bear this in mind when deciding whether to perform enucleation or to excise the growth without sacrificing the eye.

In cases where perforation has taken place it is to be remembered that a concomitant cylindroma of the ciliary body may exist on the same side as the epibulbar growth, having its origin in the retinal epithelium of the ciliary processes, such as has been described in the two cases of Treacher Collins and in that of Badal and Lagrange—and it is conceivable that the two contemporaneous growths may have met at the expense of the sclerotic in the region of Schlemm's canal, which is the point of least resistance.

Not only does the sclero-corneal limbus resist for a long time penetration from before backwards, but also the subjacent parts of the cornea and sclerotic are only with difficulty invaded tangentially, and escape tumour infiltration, which usually stops at a short distance from the pedicle of the tumour at the limbus.

The structure of these tumours has given rise to much controversy. The tumours in question arise almost exclusively from a dermic surface—the conjunctiva. A comparison with what occurs in the skin, and in the buccal and other mucous membranes, indicates the more especially epitheliomatous or cancerous nature of the affection, although not excluding the possibility of sarcoma. The age at which they occur also points in the same direction, and so does the fact that nævi, polypi, and other growths which are benign at first, may become malignant and be frequently accompanied by affection of the facial and submaxillary glands. The histological examination of 108 cases, including the author's 8, shows that 81 were epitheliomatous in nature, and 27 sarcomatous,—a proportion of 3 to 1. There is some uncertainty, however, as to the significance of some preparations, owing to the difference in opinion of competent histologists.

The epibulbar tumours situated at the limbus, to which the author specially refers, are distinguished by their progress and structure not only from choroidal sarcomata, but also from pigmented and non-pigmented tumours of other parts of the bulbar as well as palpebral conjunctiva, and which Panas proposes, on this account, to call peribulbar.

The following are the distinctive characters of the epibulbar tumours:—

Although originating in the conjunctiva they adhere from their commencement to the sclero-corneal limbus, which they invade only very slowly or not at all, even after twenty years or more; whilst sarcomata of the choroid perforate the globe and invade the orbit relatively soon after their commencement. This fact is all the more astonishing as the region of Schlemm's canal is the thinnest part of the globe.

This resistance to encroachment on the interior of the globe continues even after one or more incomplete excisions of the growth, which is not the case with carcinomata and sarcomata of other parts of the ocular apparatus.

Local recurrence has been frequently described, but not affection of glands, or metastasis in other organs, though this is so frequently observed with tumours of the eyelids and conjunctiva, and especially with tumours of the choroid. In whatever way these growths are regarded, epithelial or epithelioid cells are always conspicuous, and the alveolar arrangement occurs so often that it must be considered characteristic of true epibulbar tumours.

As to treatment, a fleshy mass at the limbus, however little it tends to progress, should be excised and the part cauterised from which it is removed. If it recurs, then similar but more complete measures are to be adopted. When it is found at operation that the growth has undoubtedly extended to the interior of the eye, then enucleation is to be performed at once or shortly afterwards. At the present state of our knowledge, primary enucleation is only to be advised when no doubt exists as to the growth having extended into the globe, or when analogous tumours are present in the palpebral conjunctiva and orbit with or without affection of the preauricular, submaxillary, and even parotid gland. In such cases enucleation is not sufficient, and complementary operations, including exenteration of the orbit, are necessary to remove all diseased parts.

C. H. U.

PANAS (Paris). The Pathology and Treatment of Glaucoma. *Archives d'Ophtalmologie, February*, 1902.

In this paper the French surgeon gives a very interesting and valuable *résumé* of his opinions upon glaucoma, especially as regards treatment. We can only give a much curtailed abstract of the original.

The definition of glaucoma which probably best suits the facts is:—That condition in which the internal pressure of the contents of the eye has become too great for the distensibility of its walls; the normal tension is equivalent to the pressure of a column of mercury approximately 26 mm. in height. So very frequently is it the case in confirmed glaucoma that the exit route from the eye is more or less completely blocked, that one might be tempted to regard this condition as the *sine quâ non* for the production of the disease, but cases also occur in which all such interference with the escape of fluids seems to be completely absent. So that we are not justified in regarding the disease as inevitably a hypertonus from defective excretion. Nor do we really know yet in what precise way it is that iridectomy exerts the good influence which it so strikingly possesses in glaucoma. The upholders of the retention theory refer the improvement of course to the opening up of the angle of the anterior chamber, forgetful that it has been shown that, however one endeavours to place the incision and to remove the iris by tearing rather than by the scissors, the wound is invariably decidedly anterior to the true angle.

Since neither on the hypersecretion theory nor on that of inefficient excretion can the value of iridectomy be explained, it has been suggested that its virtue is due to the presence of a permeable cicatrix. In the first place, no proof of a satisfactory kind exists that such a wound is permeable in the cases which do best, nor are accidental wounds of the corneo-scleral margin, unless they are cystoid. What, then, of the value of sclerotomy? Panas' view is that the benefit gained even by iridectomy is due less (if at all) to the removal of a piece of iris than to the free opening of the ocular envelope, and suggests an analogy with whitlow and peritonitis, in which a small opening is of little or no utility, while a free incision gives great and immediate relief. A relatively large incision, then, in the coats of the eye is required whether sclerotomy or iridectomy is performed. In the event, therefore, of a recurrence of tension after iridectomy, it is Panas' custom to aim at making a large opening in the immediate neighbourhood of the old section, rather than performing repeated iridectomies at different parts of the circumference. This performance, which he names oulotomy, has in his hands proved of great value many a time.

But, basing his idea upon the fact that in glaucoma the true angle of filtration is posterior to the base of the iris, he considers that results better than have been gained by anterior sclerotomy, ophthalmotomy, Hancock's operation, or any similar method, might be attained by a form of sclerotomy of which the chief features should be an incision lying in the *posterior* chamber. Before proceeding to this manœuvre on the actual patient, he made certain experiments upon excised eyes, in order to ascertain whether such an operation could be carried out without injury to the lens—an obvious source of danger. The posterior chamber, bounded by the iris in front, the equator of the lens, the ciliary processes and the zonule, does not in the physiological condition exceed two to three millimetres, but this is amply sufficient for the passage of a Graefe knife, while in the glaucomatous eye the space is often slightly larger on account of the accumulation of aqueous humour. The point of introduction of the knife is defined as 2 mm. outside the limbus in the sclera, and 2 mm. above the tangent at the extreme lower margin of the cornea; if these points are attended to carefully there is very little risk indeed of injury to the crystalline lens. As regards results of the operation Panas puts the case thus:—Out of ten glaucoma cases, two of which were hæmorrhagic and rather acute, while eight were chronic and absolute, all treated in this way, tension was definitely and permanently lowered in the two hæmorrhagic cases and one of the chronic; the others were not influenced in any way. In what respect did the cases differ, then? In this, that when the operation was done in the three successful cases, there was a considerable escape of pent-up aqueous humour, in the others hardly a drop escaped; a point whose importance, Panas thinks, has hardly been sufficiently appreciated as yet. For in those cases of *glaucome à sec*, as he calls them, the fluid may exist as an infiltration of the vitreous or lie in the supra-choroidal space, and thus be unable to escape whether sclerotomy or iridectomy be performed. The same rule of improvement where there has been some considerable escape of fluid holds good also as regards the performance of irido-sclerotomy in leucoma adherens; in this operation, as one makes his puncture he passes the point of his knife also through the base of the iris from before backwards, and as he makes the counter-puncture again from behind forwards; as the intervening bridge is divided, a considerable portion of the periphery of the iris is freely divided.

Panas recognises two varieties of chronic glaucoma: in the first there are occasional or periodical elevations of tension with obscurations of vision and coloured halos round lights. At the same time there is little or no hyperæmia, and the pupil and anterior chamber remain unaltered, but cupping of the disc is invariable, and a ring of atrophy of the choroid round the disc is very often seen. In the other, the occasional increase of tension, the obscurations, and the coloured rings are all non-existent. Some surgeons regard all the cases in this group as atrophic, others separate out from the other cases those in which the field and the colour vision are "typically" interfered with. It is obviously open to question, whether, in the total absence of any tangible elevation of tension at a given moment, one is justified in placing absolute reliance upon functional signs for a diagnosis of glaucoma, all the more that cases of undoubted glaucoma present themselves now and then, in which, though the tension is increased, there is not a trace of the classical restriction of the field to the nasal side, and so on. Further, the partisans of the duality of chronic simple glaucoma are obliged to admit that the distinction between the two conditions is by no means easy at all times to recognise. And the question is not merely an academic one, but affects gravely the mode of treatment; for while one surgeon will at once proceed to sclerotomy, another will temporise with myotics, and a third will have the temerity to apply atropine, and subsequently act according to whether the condition is or is not made worse thereby. Panas' own practice is that in chronic glaucoma in which there is restriction of the nasal field, or periodic obscuration of vision with halos round lights, hazy cornea, shallow anterior chamber, with or without dilatation of the pupil, he at once operates, and the earlier the better. In such a case the classical iridectomy, with a large incision in the corneo-scleral junction is the most suitable procedure, and should be followed up by myotics. But for all that he does not assert that in glaucoma, with little or no reaction, early operation has so constantly as encouraging an outlook as in the more acute forms. In all cases, then, of acute and subacute glaucoma, the proper treatment is the classical iridectomy, in which Panas holds that the portion of iris excised does not by any means require to be very large, provided the in-incision in the coats of the globe is of considerable length; and in cases in which tension and other symptoms return there is no advantage in subsequent repeated iridectomies, a much better procedure is oulotomy.

In chronic glaucoma, most surgeons hesitate to proceed to operation until after a more or less prolonged treatment with myotics, on the ground of the failure of iridectomy in such cases, and of the actual harm which it may do. With this view Panas acquiesces, provided one proceeds to operate so soon as the myotics cease to produce benefit, and so soon as the progressive amelioration is definitely arrested. He believes that the acknowledged disadvantages of eserine are minimised by employing an oily instead of a watery solution, that it is decidedly superior to pilocarpine, and that it should be applied several times a day and combined with the application of moist heat.

So far as his experience has gone, sympathectomy is suited solely to cases of chronic glaucoma, if to any at all, and the only effect which one can consider permanent from such operation is myosis; the immediate lowering of the tension, &c., are only temporary.

W. G. S.

STANCULEANU (Paris). **Paralysis of the Superior Oblique Muscle after Radical Cure of Inflammation of Frontal Sinus.** *Archives d'Ophtalmologie, January*, 1902.

In 1895, Kuhnt, of Königsberg, suggested a radical operation for frontal sinus inflammation. It consists in the obliteration of the frontal sinus through the removal of its anterior and inferior walls, at the same time the fronto-nasal canal is curetted, and the anterior ethmoidal cells are broken into by means of a curette or scissors, and, finally, nasal drainage is established. In Kuhnt's operation one aims at obliterating the frontal sinus by causing the cutaneous flap to adhere to the posterior wall.

In consequence of the deformity very often caused by the operation, most authorities at one time preferred the method of Ogston-Luc, by which only a part of the anterior wall of the frontal sinus is removed. After this operation, which does not obliterate the sinus, recurrence is frequent. The Ogston-Luc operation now seems to some extent abandoned. Luc himself in most cases removed at least the whole of the anterior wall and tried to obliterate the frontal sinus. Unaware of Kuhnt's work, he came to hold the same view as regards the treatment of frontal sinus inflammation; he performed the operation on a patient and communicated his notes to the French Society of Otology in 1897.

Apart from the deformity that frequently results from Kuhnt's operation, scarcely any objection has been reported. The rarity of paralysis of the superior oblique muscle following radical cure of frontal sinus inflammation, the investigations made to explain the paralysis, and the original treatment adopted by Landolt, have induced the author to publish two such cases that have come under his notice. The first case occurring in a lad, aged 19, was one of acute frontal sinus inflammation. The second case in a man, aged 26, one of old purulent fronto-ethmoidal sinus inflammation on the left side. Paralysis of the superior oblique came on in both cases after Kuhnt's operation had been performed. For full notes of the cases the reader is referred to the original article.

The author discusses the etiology of the paralysis. As the paralysis was discovered in each case at the first examination made after operation, there is good reason for supposing that it was caused by the operation itself rather than by a previous inflammation or hæmorrhage affecting the pulley or some part of the muscle of the superior oblique. If the superior oblique had been wounded at operation, this must have occurred either (1) during resection of the lower part of the anterior wall of the frontal sinus or of the orbital wall, as is practised by certain operators; or (2) when the fronto-nasal canal was curetted. But as the fronto-nasal canal is far from the superior oblique muscle and its pulley, its upper opening being usually situated at the postero-internal angle of the lower wall of the sinus, it is much more likely that the damage occurred during the resection. The point of insertion of the pulley on the orbital roof is estimated by the author from an average of measurements on ten subjects at from 5 to 6 millimetres below the superior orbital margin, and from 1 to 1½ millimetres behind the anterior margin of the inner wall of the orbit, but the insertion seems liable to certain variations in position. The superior oblique is more likely to be interfered with when the opening is made through the orbital wall than when made through the frontal wall. Sieur and Jacob, who favour the orbital route, found that of 69 sinuses appertaining to 37 subjects, 22 were limited to the superior internal angle of the orbit and had no relation to the anterior wall of the frontal bone; consequently if the frontal wall had been trephined there would have been a risk in every third case of not finding the sinus, and of opening into the cranium. From an examination of about 40 subjects Stanculeanu found that the proportion of cases with a small frontal sinus limited to the superior internal angle of the orbit was even greater than that shown by the figures of Sieur and Jacob. But in practice the sinus is rarely missed when the frontal wall is trephined because a small frontal sinus with thick walls, as has been frequently pointed out, has less tendency to become infected. However, as it may occur, it is necessary in a certain number of cases to have recourse to the orbital operation. In this operation, to judge from Sieur's and Jacob's description and drawing, the bony parts to which the pulley is attached are removed—which contraindicates the operation.

In both these cases the paralysis of the superior oblique was treated with excellent results by advancing the insertion of the inferior rectus of the affected side.

Cases of frontal sinus disease lie on the borderland between ophthalmology and rhinology, and as the ophthalmic surgeon is often called in, either at first or later, it is well that he should be alive to the possibility of such an occurrence as is recorded here, and the means (so far as possible) of preventing it.

C. H. U.

DRUAULT (Paris). Researches on Quinine Amaurosis. *Archives d'Ophtalmologie, January*, 1902.

In a previous work the author analysed the work done on this subject by Jodko, von Graefe, and others, and especially that by Ward Holden, who noticed on the third day of quinine intoxication the commencement of a progressive destruction of the ganglion cells of the retina, followed by degeneration of the optic nerve; and that of Nuel, who confirmed these points and observed chromatolysis of the same cells in a case where there had been blindness for twenty-four hours only. Before change were recognised in the ganglion cells of the retina it was generally admitted that quinine amaurosis resulted from constriction of the retinal vessels. And those who have recognised these changes have continued to hold that they are exclusively or principally due to constriction of the vessels, although perhaps the direct action of the poison upon the retinal cells may be an additional cause. Birch-Hirschfeld, who made experiments on rabbits and a dog, concludes from the character of the lesions that they are produced both by contraction of the vessels and by a direct action of the quinine. Nohl thinks that Druault does not sufficiently prove the direct action of quinine on the cells, except perhaps from their rapid degeneration. Uhthoff in a clinical case supposes that the lesions of the nerve and retina are principally due to the circulatory disturbance caused by the quinine. It is not yet agreed what is the pathogenesis of quinine amaurosis.

In this article, since details of technique and notes of his former experiments have been already reported in his previous work, the author only gives the results of these, and some points which had not been made sufficiently clear ; he also adds some other experiments relating chiefly to young dogs.

To produce amaurosis in the dog it is necessary to give nearly as much quinine as will cause death. The general symptoms are very severe vomiting, convulsions, &c. Amaurosis or amblyopia commences two to three hours after the injection, and reaches its maximum at the sixth to seventh hour at the same time as the general phenomena. Defect of vision comes on and disappears at the same time as the mydriasis. The pallor of the optic disc and contraction of retinal vessels first appear in six or seven hours, continue for twenty-four hours, then disappear, but gradually return on the fourth or fifth day, increase to the twentieth or thirtieth day, and finally remain stationary. These two really quite distinct processes have been confused, and this is doubtless the reason why the retinal changes were attributed to the anæmia.

The primary anæmia of the papilla and retina is very variable in degree; sometimes it is almost absent, at other times very intense. It is usually much less marked than the secondary anæmia, and is probably a part of the general anæmia. The secondary anæmia comes on after destruction of part of the retina; it is not the cause, but the consequence of this destruction. It cannot be attributed to the intoxication itself, because it comes on after the poison is eliminated and the general symptoms have disappeared.

The central lesion in the retina is a rapid degeneration of multipolar cells, and the rapidity of its advance is remarkable. In one case it had begun five hours after a single injection of quinine. These cells are affected unequally. It is rare for the layer of multipolar cells to become completely degenerated; even in severe cases the middle of the central region escapes, and in cases of less severity isolated cells are preserved in other parts of the retina. This accounts for the persistence of central vision observed in man, and it can only be explained by assuming that the poison acts directly on the ganglion cells. It is easy to understand that a toxic affinity sufficiently delicate to affect the multipolar cells of the retina should spare a group of these cells with special morphological characters.

The changes in the optic nerve are simply those of Wallerian degeneration. They are later than the retinal changes; they begin on the third day.

The effect of dividing the optic nerve on the retinal degeneration has been described also in the *Archives d'Ophtalmologie* (July, 1900). If the optic nerve is cut without wounding the blood-vessels, and quinine then injected into the animal, different results are obtained, according to the interval of time allowed to elapse between the neurotomy and the injection. If quinine is injected on the day after the neurotomy the retinal degeneration is similar on both sides. If it is injected two days after, degeneration of the retina on the side of the divided nerve is a little less marked than on the sound side. If injected four days after, the difference between the two sides is much greater. If the injection is not made until six days after the neurotomy, the retina on the side of the divided nerve no longer undergoes this degeneration; it certainly shows changes that result from the neurotomy, but it is not possible to mistake them for changes caused by quinine. Druault considers that this condition is incompatible with the vascular theory of quinine amaurosis. He holds, on the contrary, that it is quite comprehensible that a poison which has an affinity for a group of differentiated cells may lose this affinity when the cells in question are profoundly modified, as is the case with the ganglionic cells after optic neurotomy.

With the object of modifying the nutrition of one of the eyes before injecting the quinine, the following operations were made on dogs, but with negative results: iridectomy, opening the sclerotic by the thermo-cautery, instillation of eserine, injection of strong salt solution into the orbital cellular tissue, section of the cervical sympathetic, of the fifth and third nerves. It must be borne in mind that the retina of the dog is not completely developed at birth. If the view is accepted that quinine has an elective toxic action on the multipolar cells of the retina, it may be presumed that this elective action will not become manifest before the multipolar cells are clearly differentiated from all other nerve cells.

In experiments made on dogs from four different litters it was found that no retinal changes occurred in dogs of a less age than fifteen days, but the changes in the retina of dogs of fifty days or above were similar to those in the adult. It is in this interval from the fifteenth to the fiftieth day that the dog begins to see, and that its retina assumes the characters of the adult retina, especially in the layer of the multipolar cells. The quantity of quinine necessary per kilogramme of animal to produce marked or fatal general intoxication is much greater for young dogs than for adults.

In conclusion the author says that the multipolar cells of the retina of some animals, especially the dog, show a special susceptibility, very marked in quinine poisoning. This elective action of a poison for a group of cells is explained by the great differentiation of these cells, and is proved by the fact that it takes place only when the cells have reached their full development, and by its absence when the cells have been modified by section of their axis cylinders. C. H. U.

MORAX. Necrosis and Gangrene of the Eyelids.

Annales d'Oculistique, January, 1902.

Roger and Weil in *La Presse Médicale* (September, 1901) have related the case of a healthy patient who presented inflammatory lesions of both eyelids on the left side. Briefly, the left side of the patient's face, from the eye to the ear, was enormously swollen, reddened, and painful without fluctuation. The eyelids were so œdematous that they could not be opened, and on them were situated several gangrenous plaques, of irregular serpiginous outline, bathed in pus which was odourless. There was no swelling of the regional glands, and the constitutional disturbance was extremely slight. Bacteriological examination, in aerobic media, showed a micrococcus having all the characters of staphylococci, but not liquefying gelatine.

In the course of some seven weeks the patient left hospital without a trace of the serious lesions which he had presented save a slight ectropion at the external canthus and a slight conjunctivitis. Vision was perfect.

MM. Roger and Weil in conclusion observe of their case that gangrene has been usually attributed to anaerobic microbes, but that from numerous facts they cannot agree that this characteristic is necessary to the microbes which cause it.

Morax, having given full details of Roger and Weil's case as above, adds particulars of two cases of his own, similar in all respects save that he isolated the streptococcus, while MM. Roger and Weil found a coccus very like the staphylococcus, but not liquefying gelatine.

Morax joins issue with Roger and Weil with reference to the name which they have applied to the disease, viz., "benign gangrene of the eyelids." He points out that by the term gangrene is usually meant "a destruction of the tissues accompanied by putrefaction," or, in other words, a putrid necrosis. Now from the careful researches of Veillon and his pupils there would appear to be no doubt but that this peculiar odour of putrefaction is always connected with the presence of anaerobic organisms, though on the other hand there certainly remains the fact that aerobic organisms in some cases of suppuration can cause a repulsive odour; still it is not the odour of putrefaction.

Morax suggests that instead of the word "gangrene" we should use the terms "putrid" and "non-putrid necrosis," and the dry gangrene of diabetics could be included in the latter class.

Cases of putrid necrosis of the eyelids are extremely rare, and Morax only found two recorded in literature, one by Roemer, and one by himself and Veillon. Other cases have been reported by Randall, Plant, Talko, &c., but the bacteriological examination of the latter ones was not carried out so fully as in the two former, in both of which anaerobic microbes were found.

In conclusion, Morax is of opinion that in all cases of putrid necrosis anaerobic microbes are found as the cause (though this does not mean that non-fœtid suppurations cannot be caused by anaerobic microbes), and to this class of putrid necrosis he would limit the word "gangrene," while necrosis without the odour of putrefaction he would term "non-putrid necrosis." The former class, in his opinion, is always associated with anaerobic microbes.

A bibliographical list is appended to Morax's article.

FRANK C. CRAWLEY.

KALT. Orbital Cysts with Walls covered with Vegetations and of sudden Onset. *Annales d'Oculistique*, *Jan.*, 1902.

As every one knows, the diagnosis of the nature of an orbital tumour is often very difficult. It has generally been admitted that the onset of solid or liquid tumours, excepting hæmatoceles, is usually slow, while blood or gaseous swellings are most often the cause of the sudden protrusion of an eyeball in a healthy patient ; of course the sudden rupture of a vessel in a telangiectic sarcoma must also be excluded, as it well may be from its extreme rarity.

M. Kalt reports two cases, in both of which the onset of the proptosis was sudden, occurring in a few hours. In one, the proptosis had lasted for one year ; in the other, for six years ; both tumours were removed by Krönlein's operation. The first had a very thin wall lined with vegetations which bled freely : the tumour also contained some turbid fluid, but no traces of hæmorrhage. The other contained no fluid nor hæmorrhages, was enclosed in a firm wall, and contained vegetations of a fibroid character which hardly bled at all.

In neither case was there any return a year after the operation, though the thin-walled cyst was merely curetted out ; the other being removed *en masse*.

Pathological examination showed both tumours to be of a sarcomatous nature, particularly benign in character and encapsuled.

It should be added that both tumours appeared to spring from the neighbourhood of the sphenoidal fissure.

The most difficult point for explanation with reference to these cysts is their sudden onset. A sudden hæmorrhage into a pre-existing cyst affords one explanation. But M. Kalt points out that such a hæmorrhage would leave traces of its presence, and any tumour, however small, situated at the apex of the orbit would almost of necessity cause symptoms prior to the protrusion of the globe. He calls attention to cases reported by Knapp (Utrecht Congress, 1900), Hartridge (OPHTHALMIC REVIEW, 1899), and Ring (*Jahresbericht*, 1899), of various forms of orbital cysts, and is driven to the conclusion that in his two cases these small tumours must have grown without the patient's knowledge, until a sudden increase of fluid pushed forward the globe and so called attention to them.

FRANK C. CRAWLEY.

SPILLER (Philadelphia). A Case of Complete Absence of the Visual System in an Adult. *University of Pennsylvania Medical Bulletin, February*, 1902.

This paper is the record of the *post-mortem* examination of the brain of a young man, aged 22, with a few notes of the condition *intra vitam*, the original of which, with its fuller record than we can here reproduce, will well repay study. The case was that of an idiot, undersized (3 feet 11 inches) and quite undeveloped. He was absolutely helpless and very unclean; the only words he could utter were "Mama" and one or two monosyllables, but he was evidently much influenced by music. Notes taken in 1897 show that he had cerebral spastic paraplegia of the lower limbs, and absence of the eyeballs; he was unable to stand alone, but when supported could take a few steps by cross-legged progression. His body looked like that of a boy of twelve, the testicles were undescended, there was no growth of hair on face or pubes; the circumference of the head was 18¾ inches.

At the necropsy, since permission was not granted for removal of the orbital contents, it could only be reported as regards that matter that no eyeball could be discovered, and that the orbits appeared to contain nothing but fibrous connective tissue. On opening the skull, it was found that the optic foramina did not exist; no trace of optic nerve, chiasma, or tract could be discovered; there was no sign of an external geniculate body on either side, nor had either thalamus anything resembling an optic tract passing from it. The anterior colliculi of the corpora quadrigemina were fully as large and as well-developed as the posterior. The occipital lobes were small: the cuneus on each side small: the calcarine fissure was short.

Numerous sections of the brain in various positions were made and examined, both macroscopically and after staining and mounting. The optic radiations in the frontal sections of the occipital lobe were not entirely absent, but the area occupied by them was not very distinct.

Meynert's commissure was normal. Careful examination of the serial sections failed to show the slightest trace of an external geniculate body on either side, although the internal geniculate body was well developed. Some few medullated nerve fibres were found within the pulvinar, but those in the posterior portion of the thalamus were much fewer than those in the more anterior parts. Sections through the oculo-motor nuclei contained many nerve cell bodies belonging to them, and these cell bodies appeared to be normal, so far as microscopic examination and staining could show. To all appearance also the transverse sections of the oculo-motor nerve were normal; the nerve as a whole might perhaps be a little smaller than in a normal brain, but there was no scarcity of large nerve fibres. The nerve fibres in the sixth nerve were found to be exceedingly small, much more so than those of the third and fourth nerves.

In regard to ophthalmic matters, Spiller draws the following conclusions from his case, which is certainly a very rare one, though not absolutely unique:—

(1) The chief "primary" optic centre is the external geniculate body. (2) The pulvinar of the optic thalamus is also an important "primary" optic centre. (3) The anterior colliculus of the quadrigeminal body in man has an unimportant relation to vision. (4) The hypothalmic body, the habenula, the internal geniculate body probably are not part of the visual system. (5) The cortex of the calcarine fissure may contain nearly the normal number of cell bodies, even though the visual system may be undeveloped. (6) The nerves to the ocular muscles and their nuclei may be developed, even though the visual system is absent.

W. G. S.

ANNULAR SCLERITIS.

(*Sulzige Infiltration der Sklera.*)

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I HAVE recently had an opportunity of examining microscopically a case of scleritis belonging to the class of cases first described in 1897 by Schlodtmann[1] under the title "Sulzige Infiltration der Conjunctiva und Sklera." Since then other examples of this severe type of inflammation have been described by Friedland[2] and Uhthoff.[3] As they offer some peculiarities and have not hitherto been mentioned in the scanty English literature upon the subject, a short *résumé* may not be out of place.

It is impossible, pathologically, to draw any hard and fast line between the deeper forms of conjunctivitis, or episcleritis, and scleritis. In the very limited number of cases which have been examined microscopically, the general type of infiltration has been characteristic, but the relative extent has varied considerably, and apparently out of all proportion to the apparent clinical severity. Even clinically, episcleritis merges into scleritis, and the latter, though usually nodular like the former, is invariably more diffuse, and less commonly invades the whole circumcorneal area. The severer cases grouped together by German authors under the term "brawny infiltration of the sclera" invariably affect the whole region around the cornea; and as the German nomenclature is not very satisfactory, I propose to use the term "annular scleritis."

Ophth. Review. Vol. XXI., No. 249, July, 1902.

Unlike ordinary scleritis, which usually attacks young adults affected with tubercle or congenital syphilis, annular scleritis is a disease of advanced age. All the cases recorded have been in patients over 60 years of age, and most of them were women. Both eyes are usually affected, though often to a very unequal extent. The progress of the disease is extremely chronic, with periodic exacerbations and remissions. The prognosis is very bad, most of the eyes being lost ; hence the comparatively large number which have been examined microscopically, as compared with ordinary scleritis, pathological reports of which are extremely rare.

The locality and extent of the infiltration is characteristic. Even when typical scleritis invades the whole circumcorneal area it leaves the limbus itself free, thus differing from phlyctenular nodules. Here, on the other hand, the corneal margin is the essential site of the affection, and from this spot the infiltration spreads on both sides into the neighbouring tissues, having a sharp edge on the side of the cornea, which it partly overlaps, and gradually passing into normal tissue on the side of the sclerotic. In advanced cases, extension continues in each direction, so that it reaches the equator posteriorly, but never much exceeds this level, whilst anteriorly it invades the cornea as a peripheral sclerosing keratitis, ever advancing slowly towards the centre.

The appearances of the infiltration were sufficiently characteristic to lead Schlodtmann to identify the complaint by them. In other cases, the existence of the scleritis has only been discovered subsequently to the removal of the eye. In typical cases the swelling is gelatinous and succulent, and has a brownish-red colour.

Besides the cornea, the uveal tract is usually inflamed, especially the anterior part of the choroid and the ciliary body. As in the case of ordinary scleritis, discussion has arisen as to whether this uveitis is secondary to the scleritis or causal. In each case it is probably a secondary phenomenon, sometimes a true sequel, at others a mere concomitant.

There are three records of microscopical examination in annular scleritis. Schlodtmann describes three cases clinically, one of them pathologically. The patient was aged 74. The conjunctiva was reddened for about 5 mm. around the cornea, traversed by large vessels, and raised by a brawny, reddish-brown thickening above the underlying tissue. In this area there was enormous dilatation of blood-vessels and lymphatics, the latter forming cavernous spaces under the epithelium. In the deeper layers was an intense leucocytic infiltration, containing numerous necrotic masses, communicating with each other in a plexiform manner. Giant cells were present to an enormous number. No tubercle bacilli could be found.

In Friedland's case the distribution was the same; there was no tendency to suppuration, and Friedland points out that the leucocytes were all mononuclear cells with a relatively large nucleus and little protoplasm. Distinct degenerative processes (breaking up of nuclei, amorphous material, &c.), were present both in the scleral fibres and also amongst the round cells. The absence of giant cells, epithelioid cells and bacilli was considered sufficient to exclude tubercle. There was no evidence, clinical or pathological, of syphilis, gout or rheumatism. In one eye choroiditis came on late and led to failure of sight; in the other, no uveitis occurred. Friedland regards the scleritis and choroiditis as "primary independent diseases arising from a common cause."

Uhthoff's case was similar in localisation, extent, and general histological conditions. There were no giant cells, the round cells were all mononuclear, showing marked nuclear degeneration, and the lymphatics and blood-vessels were dilated. The author draws attention to the thickening of the walls of the blood-vessels, with endothelial proliferation, leading to partial and even complete blocking of the lumina ; and regards the obstruction to circulation as an important factor in the disease. There were distinct nodules in places, recalling trachoma follicles, composed of a central mass of endothelial cells surrounded by a zone of infiltration. No micro-organisms could be found.

The case which I have examined will be described fully elsewhere,[4] as the scleritis alone is of interest here. The woman, aged 68, was admitted to Moorfields Hospital under Mr. Holmes Spicer. The left eye had been injured two years previously by a blow. Both eyes were inflamed ; the vision of the right was $\frac{6}{6}$. The left had annular scleritis, keratitis punctata, iritis, opacities in the lens, arterio-sclerosis, cystic retina at posterior pole, and increased tension with cupped disc. The scleritis was found to extend entirely round the anterior part of the globe, and back to the equator. It is deepest above, where the sclerotic is reduced to extreme thinness, only about half a dozen lamellæ remaining intact. The superficial lamellæ are separated from each other and partly destroyed by dense infiltration with mononuclear lymphocytes. The blood-vessels have proliferated, and are dilated and full of blood corpuscles. Some polymorphonuclear leucocytes are found near the blood-vessels, especially in the episcleral tissue. In places there are signs of endothelial proliferation in the vessels, but this is not marked. The infiltration is diffuse, and there are no nodules, nor are there any giant cells.

In this case the inflammatory and degenerative changes are so widespread that it is impossible to be sure of their relative sequence. Uveitis is considered to be the precursor of ordinary scleritis by Arlt,[5] Kostenitsch,[6] Schirmer,[7] Greeff,[8] and others. The direction of the lymph stream, and the facility of transmission along the course of the anterior ciliary vessels are in favour of this view. The essential identity of the processes in episcleritis and scleritis, the invariable absence of uveitis in pure episcleritis and its almost constant presence in severe cases of scleritis, however, point to uveitis as a sequel rather than as a causal agent. Moreover, it is probable that scleritis often occurs without being diagnosed, and in the absence of any evidence of uveitis. Friedland, too, in a case of typical scleritis, found that the patches of choroiditis did not correspond in position with the nodules of scleritis.

The extreme chronicity of all forms of the disease points to a specific inflammatory process, a view which is borne out by the nature of the leucocytes present. The advance is doubtless impeded by the extreme resistance of scleral tissue to invasions of all kinds, inflammatory or neoplastic ; and perhaps also by its direction contrary to the normal lymph flow.

The line of exit of the venæ vorticosæ seems to limit the backward progress of the inflammation ; and this is possibly due to better nutrition of the sclerotic behind the equator.

Schlodtmann's case, although the one which was first described of this kind of scleritis, is open to another interpretation. It may well be a severe case of the granulomatous type of infiltration. To this class probably belong the cases recorded by Brailey,[9] Donald Gunn,[10] and others. Brailey's case was probably tubercular ; it occurred in the left eye of a scrofulous child of 9½, with enlarged cervical glands. The episcleral tissue was thickened, and greyish in colour, the surface breaking down and ulcerating in several places after a few weeks' duration of the disease. Portions removed for diagnosis showed tubercular nodules with lymphoid infiltration, giant cells and definite caseation. Tubercle bacilli could not be demonstrated.

Donald Gunn's cases showed similar appearances clinically, occurred in young adult men, and were probably syphilitic.

The presence of large numbers of giant cells in Schlodtmann's case points to its being of different origin to the other cases. In the absence of definite tubercles with caseation, and considering the inability to find tubercle bacilli, the giant cells may have been ordinary foreign body giant cells (Fremdkörper-Riesenzellen) such as are found in granulation tissue. However this may be, there can be little doubt that the severer cases of deep scleritis show definite characteristics as regards localisation, nature of infiltration, &c., which justify their being classed apart.

REFERENCES.

[1] Schlodtmann, *Graefe's Archiv*, Bd. xliii., 1, S. 56.

[2] Friedland, *Graefe's Archiv*, Bd. xlviii., 2, S. 283.

[3] Uhthoff, *Graefe's Archiv*, Bd. xlix., 3, S. 537.

[4] Spicer, *Trans. of the Ophth. Soc., June* 12, 1902.

[5] Arlt, *Die Krankheiten des Auges*, Bd. ii., S. 11.

[6] Kostenitsch, *Archiv f. Augenheilkunde*, Bd. xxviii., S. 27.

[7] Schirmer, *Graefe's Archiv*, Bd. xli., 4, S. 158.

[8] Greeff, *Orth's Lehrbuch*, *9te Lieferung*, S. 208.

[9] Brailey, *Trans. Ophth. Soc.*, vol. ix., p. 82.

[10] Donald Gunn, *Trans. Ophth. Soc.*, vol. xiv., p. 68.

REVIEWS.

FUCHS (Vienna). Nodular or Guttate Opacities of the Cornea. *Von Graefe's Archiv für Ophthalmologie, liii.* 3.

The first description of this rare disease was given by Groenouw under the name of "knötchenförmige Hornhauttrübungen" in the following terms: "The disease consists in the development of numerous small, rounded or irregular, gray, discrete opacities in the otherwise clear cornea. The larger opacities attain to a diameter of nearly $\frac{1}{4}$ mm., and between these lie much smaller, dust-like, gray points; they, for the most part, are situated in the central region of the cornea, and rather avoid the marginal zone. The larger spots slightly raise the epithelium, and thus give a certain minute irregularity to the surface. The opacities appear by degrees without any inflammatory reaction, and may remain for years unchanged." It illustrates the rarity of the condition when Fuchs mentions that he has only seen eight cases since 1889 out of an enormous clinique, and that these eight, with Groenouw's two, and one by Chevallereau and one by Krukow, represent all the published cases.

The first of Fuchs's cases, the description of which must serve as a type of all, occurred in a young medical student who five years previously had had an attack of acute inflammation of the eyes, with photophobia and some little pain, but this did not last long, and it was solely on account of the opacities present that he sought advice, for the eyes were perfectly free from any irritation. In each eye the middle portion of the cornea was somewhat uneven and dull; the elevations consisted of little spots, which were of a gray colour, indeed almost white, and even with a powerful lens could not be "broken up" into minuter dots, as is the case with many of those spots in other forms of opacity. The spots lay in the extreme anterior layers of the cornea, and the epithelium over them was raised;

between them the cornea appeared to the naked eye not perfectly transparent, and on magnification numerous minute, cloudy, gray dots could be seen. This faint haze could be traced quite to the margin of the cornea. Slow changes took place in the arrangement of the worse opacities as time went on, but, though with some fluctuations, vision did not eventually become any better than it had been, viz., $\frac{6}{8}$ in the right eye, $\frac{6}{12}$ in the left. After a short account of other seven similar cases, and a brief reference to those recorded by Groenouw, Chevallereau, and Krukow, Fuchs goes on to discuss some of the features of the twelve cases.

Except one, all the examples seen have occurred in men, the single exception being a girl, aged 17 (Groenouw), and young men were affected rather than their elders. There did not appear to be any connecting link between the various patients in regard to external circumstances, similarity of occupation, or constitution ; syphilis, whether hereditary or acquired, was quite obviously not a factor. In most of Fuchs's own cases the patient had passed through a brief and not unduly severe inflammation of the cornea, and three had had repeated keratitis in childhood, though this peculiar defect of sight first made itself manifest later in life.

In all the cases the cornea presented a somewhat dulled, uneven aspect, and its superficial sensitiveness was lessened, though not to a degree so great as in herpes corneæ and the forms of keratitis related to it (superficial punctate, &c.). The dimness of the cornea in this disease is due to two factors, the formation of circumscribed dots, and a diffuse haze. These spots seem specially to favour the pupillary area, they are of a grayish or bluish white, and to the naked eye appear sharp in their margins, though on magnification the edges may be less defined. A curious point seems to be that while one of the larger areas may contain a more intensely white and opaque dot, one never sees a white ring with a clearer centre, such as is common enough in other forms of keratitis. Though at each spot the epithelium is lifted up, the opacity is not in the epithelium itself, for if the overlying membrane is removed the spot itself remains; it is situated in the corneal substance, but very superficially. In the majority of the cases there were two varieties of opacity, a larger, chiefly occupying the central pupillary area, and probably enough formed by the fusion of several more minute dots, and a smaller, less dense, which seemed to have a tendency for the individual spots to arrange themselves in a ring round the larger. The sizes and shapes of the spots varied greatly, and altered in a given case as time passed by, old spots disappearing and new appearing, and changing by fusion with others; but gradually the transparency of the cornea was apt to diminish, and vision to sink until, in Fuchs's worst case, it was reduced to finger counting at one metre. In addition, a diffuse dimness of the cornea between the spots was present in all the cases, which under the magnifying lens resolved itself into a multitude of minute dots, and might be more intense either at the centre of the cornea or more towards the peripheral zone. The deeper layers of the cornea and the other parts of the eye remained quite normal. Both eyes seem to have been affected in every instance.

In one of his cases Fuchs removed a small portion of the superficial layers of the cornea with a trephine; this he hardened and cut, and in it he found the following pathological processes proceeding: (1) A uniform change in the most superficial layers of the cornea, the effect of which had been to render them lighter, less tinted, than the deeper portions; this difference in colouration was very marked with certain of the stains employed. In this layer the lymph spaces were larger and wider than elsewhere, the cells in them and their nuclei were also larger; the whole tissue looking as though it had imbibed a good deal of fluid. Bowman's membrane was not recognisable. (2) In the midst of this layer certain discrete areas appeared, at which, the tissue there being thickened, the superficial portions were very slightly raised; in regard to thickness and disposition the epithelium was unaltered, except where a patch happened to be, but the chromatin substance had congregated at the side of the nucleus of each cell next the surface ; wherever a little nodule was there was a very slight lifting up of the epithelium. (3) At certain spots there was a deposit of some amorphous substance, which here and there forced the layers apart. This deposit in the deeper layers was most marked at the places corresponding to the nodules in the superficial layers. (4) At similar situations a change was manifest in the staining of the tissues. This seemed to point to the seat of the whole mischief being in the cells lying between the deeper (properly staining) and the superficial (altered staining) layers, and to consist in the presence of mucin in these lamellæ. The endeavour to discover the presence of bacteria was not successful. To sum up the pathological changes then, these consisted of the swollen condition of cells in the superficial layers of the cornea, the deposition of an amorphous substance, especially at certain levels, and an alteration of the layers immediately underlying the superficial shown by the difference of pigmentation.

The condition is obviously not an inflammatory one, rather it is a form of degeneration which consists in the cornea becoming saturated with a pathological fluid and its localised deposition among the cells. Fuchs knows of no precisely analogous condition in the human subject, but has seen preparations (by Sorgo) of the cornea of a dog fed on thyroidin which showed a somewhat similar condition. In the last of his patients, the only one in whom he really looked out for the condition, he found a large thyroid, but no symptoms of thyroidism. This is a point which will engage his attention when next a case of this rare condition is met with.

W. G. S.

HOLTH (Christiania). Kinescopy, a New Method of Testing the Refraction of the Eye. *Annales d'Oculistique, April*, 1902.

The germ of this novel method of examining the refraction may be traced back six years, when Holth was engaged in some other investigations regarding the eye, in the course of which he had to regard fixedly a white disc against a black background, and noticed that, on winking, the object underwent a slight apparent displacement. He attributed this to a coincident movement of the eye which he supposed to exist, but further investigation convinced him of the incorrectness of this assumption; for he found that when fixing an object, if he, without winking, interposed a piece of cardboard between himself and the object, but much nearer to the eye and not in the direct line of fixation, the edge of the card appeared to push the fixation object before it, so to speak. This was in the vertical meridian, in which he is myopic; if the same manœuvre was conducted in the horizontal meridian, in which he is hypermetropic, the apparent movement was the contrary way. (In the meantime we may disregard a slight obliquity due to the inclination of his principal meridians.) On repeating the experiment while wearing precise correction of his ametropia, no movement whatever could be discovered. This suggested to him that the refraction of a patient might in this manner be tested, and in particular the idea was brought again to his mind by the case of a man who was endeavouring to obtain compensation for loss of vision in one eye. He refused to admit any improvement in vision beyond $\frac{6}{60}$ with any lenses, and at the same time objective methods of examination were extremely unsatisfactory on account of the extremely small size of his pupil, which was further bound down firmly to the capsule and could not be dilated.

Six metres from the patient he fixed an object 10 cm. in diameter, while between it and him he placed a screen having a slit 1 mm. wide, through which the patient regarded the white object. When this screen was moved in a direction perpendicular to that of the slit, the patient admitted that the object appeared to travel against the movement of the screen until a lens of + 3 D was worn; this held good for all meridians, and appeared to indicate a hypermetropia of 3 D. By means of a little diplomacy, the patient, a man, aged 53, was induced to admit vision of $\frac{6}{12}$ when wearing the correcting lens thus found. Such an examination can be conducted well enough without any further apparatus than the trial lenses and a stenopaic slit, but as it is somewhat difficult, for one thing, to keep exactly to the true meridians, Holth has had an instrument constructed, which he calls a kinescope. Of this it is not possible to give a full description here, but the author's explanation is very clear and not long. It consists essentially of two concentric metal rings, the outer one of which is graduated to show the meridians; the inner, which moves on the other, carries a transverse bar, to the centre of which, again, is fixed a hollow, tranated cone or cylinder pierced by a stenopaic slit: the axis of this slit is precisely at right angles to that of the bar. The bar is attached in such a manner to the internal ring that a to-and-fro movement of bar and slit-bearing cone is permitted to the extent of 3 mm. strictly in the long axis of the bar, at right angles, that is, to the axis of the slit. Either by means of the ordinary spectacle frame or by a rotating disc, lenses are fitted to the eye under examination and rapidly changed, and through the lens and slit the patient regards the fixation object. This should be of such a nature as not to call upon the accommodation, and Holth finds the best to be a white disc, 5 to 10 cm. in diameter, mounted on a dull-black background, exactly at the height of the patient's eye, and at six metres distance. For convenience the back of this disc is provided with a small bar, is graduated, and can be rotated so that the bar is parallel to the stenopaic slit in the main part of the apparatus.

With this instrument then, thus briefly described, Holth has examined numbers of persons with varying degrees and qualities of ametropia, has compared his results with those obtained subjectively and by means of the ophthalmometer, direct estimation, and retinoscopy, and has been much pleased with his success. The emmetrope, looking through the stenopaic slit, sees the fixation object quite stationary; the myope sees it move in a direction the same as that of the travelling slit; the hypermetrope sees a movement opposite to that of the slit. The same care is needed as in subjective testing to allow for latent hypermetropia, or for accommodation readily called into action; if, for example a myope sees the stationary object appear as though moving with the slit until, say, —3 D is put up, and when one then goes on to place —3·5 D in the frame the same is true, then 3 D is more correct than 3·5 D. With some patients, again, the accuracy of the method is very great, a difference of ·25 being quite sharply appreciated. The principal axes in any case of astigmatism are very readily and precisely obtained, for it is only when the slit-bearing bar is in one of these meridians that the apparent movement of the fixation object is simple: in all others it forms an angle with the line of movement of the slit. The weak point in actual practice as regards this is that it requires considerable intelligence and accuracy on the part of the patient to notice slight deviations, and the axes require to be checked by some other means. In cases of astigmatism, too, it is best—as, indeed, it is in all other methods of examination—to correct the more aberrant meridian with a convex spherical lens, and on the top of this to place a concave cylinder, the weakest possible, as in this way there is less temptation to the patient to accommodate. Especially when the pupil is dilated artificially many patients will state that no lens placed in the frame seems to them to cause the object to remain stationary; this is due to aberration of rays passing through the less central area of the cornea; but if no mydriatic is used, some patients show great accuracy in perceiving the least movement. Thus one of Holth's hypermetropes was quite confident that the image travelled against the slit with +3·75 D (under correction), and with the slit with +4 D (over correction). Of course, if one prefers to dilate the pupil, he may employ a stenopaic circular aperture in addition to the slit as an artificial iris, but Holth finds this to be distinctly less satisfactory than leaving the accommodation alone. Kinescopy, though useful under all conditions in which the refraction has to be tested, finds its chief value in those patients in whom the acuteness of vision is low, either naturally or from some haziness or opacity of the media; and, as has been indicated, where simulation is suspected. In one or two albinos, also, Holth found it to prove very valuable, for not only was vision indifferent, but the pupil contracted so extremely when the ophthalmoscope was used, that these methods of examination was very difficult indeed. Even in two cases of congenital nystagmus he was able to determine the refraction exactly, although at first sight one might suppose the method to be inapplicable in such a condition; in congenital nystagmus, however, the patient attributes to the object looked at no pathological motion.

The explanation of the apparent movement undergone by a fixed object during uncorrected ametropia may be expressed thus: Suppose, for convenience, that in each of the three cases the slit travels from above downwards: in the emmetrope, since the rays coming through any part of the pupil are focussed on one spot upon the fundus, there will be no apparent movement; in the hypermetrope, the rays striking the retina before focussing, the image will travel down the retina, and the fixed object will therefore be considered to be moving in the opposite direction to that of the slit. In myopia, the rays having already crossed, the direction will be reversed in the fundus (up the retina), and therefore will be direct after projection; the object, in other words, will be supposed to travel with the stenopaic slit.

From the study of the unusually interesting paper the reviewer can well believe that kinescopy will prove of much value under various circumstances.

W. G. S.

BAUDRY (LILLE). Technique Opératoire Oculaire. *Paris: Masson and Co.*, 1902.

Professor Baudry is responsible for the description of the operations upon the eye and its appendages in a large work which is at present coming out, dealing with surgical operations in general. Anything which comes from his hand is sure to be a thorough piece of work, and the present treatise of 120 pages is no exception. The descriptions in the letterpress are plain, simple, clear, brief and sufficient; the diagrams are very numerous indeed, and very illustrative. The portion by Baudry can be obtained as a separate book, which is calculated to form a valuable addition to the library of any ophthalmic surgeon.

TRANSACTIONS OF THE HEIDELBERG OPHTHALMOLOGICAL SOCIETY.

AUGUST, 1901.

On Dichromatic Colour Systems.—W. A. Nagel (Freiburg). Hering's theory of colour vision has gained many adherents among ophthalmologists, but has never been accepted by physiologists, in whose view the notion of processes of assimilation and dissimilation, excited by stimuli and mutually opposed, is incompatible with what is known of the irritability of living material. A theory may be in harmony with the sensations observed, but may be nevertheless in contradiction to the facts of the irritability of the light-perceiving substance in the retina. Hering's theory has led us astray in this respect. He assumes only two kinds of partial colour-blindness — blue-yellow and red-green blindness. The common division into red-blind and green-blind he accounts for by the more or less accentuated pigmentation of the macula lutea. But the distinction between red and green blindness is perfectly sharply marked when tested by light waves which are not at all absorbed by the macular pigment, viz., the rays from the extreme red to the greenish yellow of the spectrum. Another point which has been established by v. Kries is that the difference of type (between red and green blindness) is just as strongly marked in the periphery, where the macular pigment has no influence. Nagel finds, too, that the actually observed pigmentation of the macula bears no relation to the type of colour blindness. The distinction between red and green blindness has been often confused owing to imperfect methods of testing. One method is vitiated by the action of the macular pigment. This is the test with light of short wave length. The macular pigment affects also the position of the neutral point in dichromatic eyes, and renders the results of examination with rotating discs uncertain. Another source of error is neglect of complete adaptation before testing. No reliance can be placed in the method of testing by measuring the shortening of one or other end of the visible spectrum. The two types, red blindness and green blindness, must remain sharply differentiated until some one either demonstrates that the irritation curve for the long wave end of of the spectrum lies between the two types, or exhibits a case in which 100 or 150 parts of lithium red equals 10 parts sodium light in the dispersion spectrum of gas-light, and not 37 parts or 200 parts, as has hitherto been the universal experience.

In the discussion, Raehlmann observed that in his experience numerous intermediate cases were to be found between the two types; but Nagel attributed this to faulty methods of testing.

Pupillometry, Etiology of Anisocoria, and Defects of Pupillary Movement.—L. Bach (Marburg). Bach's method of pupillometry is to place the patient in a dark room in front of a lamp, and looking over the observer's head into distance. This gives the pupil diameter in dim light, with relaxed accommodation and convergence, measured by Haab's pupillometer. The reactions are then observed by throwing light from the ophthalmoscope into the eyes. The patient then faces the light, and the pupils are tested by oblique illumination, and then by direct light from the lamp. The convergence reaction may be tested by daylight.

Bach has examined some 300 cases systematically as above, and the following are his comments: The common opinion that the direct and indirect reactions are equal in intensity is erroneous; the contrary can usually be demonstrated, as, indeed, our views of general physiology would lead us to expect. It is certainly untrue that no anisocoria results from a lesion of the afferent fibres in one eye. Anisocoria is common, and always pathological. If light and convergence reactions are normal, the cause lies probably in the cervical sympathetic, or in developmental defects of the iris. In strabismus concomitans the pupils are usually equal and react equally, and the same may be present in extreme amblyopia and anisometropia. The pupil is not wider in myopia than in hypermetropia. In such conditions as orbital neuralgia the pupil is larger on affected side. Reflex pupil paralysis is found almost exclusively in tabes and tobacco amblyopia. Unilateral reflex paralysis occurs, and is an argument against the theory which assumes a direct connection of the reflex fibres in the optic nerve with the third nucleus, and a close union between the sphincter nuclei. It is erroneous to assert that the macular region is alone the source of the pupil reflex. A reflex paradoxus occurs when the pupil dilates on illuminating the eye; this is found most frequently in tabes and general paralysis. Distinct contraction occurs not very rarely on closure of the lids.

Bach differentiates (1) reflex paralysis—loss of direct and indirect light reaction with retained convergence reaction; (2) amaurotic paralysis—loss of direct reaction, as well as of indirect reaction of the other pupil, but with reaction of both pupils when the other eye is illuminated, and with normal convergence reaction; (3) absolute paralysis—when no reaction occurs under any conditions.

An Unusual Pupil Reaction, viz., the Contraction on Forcible Closure of the Lids, with Remarks on the Structure of the Sphincter Nucleus.—Karl Baas (Freiburg, i. Br.). Baas holds that this reaction cannot be produced by merely peripheral causes, such as venous stasis and passive hyperæmia of the iris, although it apparently occurs only with a wide pupil. It is more probable that a connection exists between the so-called ocular-facial and the third nerve nucleus. The fact that, as in the case he reports, this contraction may remain as the only sign of vitality in the sphincter, induces him to assume a peculiar structure in the sphincter nucleus: (1) A group of cells dealing with the light reflex; (2) another group dealing with the convergence reaction; and (3) a third dealing with the reaction on closure of lids. These different groups may be differently affected by various pathological lesions.

In the discussion following these two papers, Wolff advocated the method of focussing an image of a lamp sharply on the retina in testing the light reflex, and stated that he could demonstrate three different reflexes according as the centre, the periphery, or the intermediate zone of the retina was stimulated. Straub stated that an examination of some thousand normal eyes had demonstrated to him that the myopic pupil was on an average wider, and the hypermetropic pupil smaller than the emmetropic. Schirmer expressed himself somewhat sceptical as to the direct reaction being greater than the indirect, and thought the tests inconclusive. Schanz regarded the lid reaction as a purely peripheral phenomenon. Schwarz described his method of investigating the pupil reflex, &c. Levinsohn considered that heat might be the cause of the direct reaction being greater than the indirect, and could not allow that the sympathetic was at all a frequent cause of anisocoria. Bernheimer asserted that no clinical observations could be accepted in opposition to his experiments of section of the chiasma, and division of the tract, which are conclusive evidence for the existence of anatomical connections between terminal twigs of the opticus and the ganglion cells of sphincter nucleus, and between the "dendrites" of the two sphincter nuclei.

Baas's hypothesis of cells of different physiological function in the sphincter nucleus is quite untenable.

Pathology of Corneal Endothelium.—E. v. Hippel (Heidelberg). v. Hippel pursues his investigations with fluorescin, and finds that though it is certain that endothelial lesions are evidenced by the deep green staining, the explanation is not so simple a matter. These are the facts: Fluorescin instilled into the conjunctival sac produces a deep staining of the cornea if the endothelium has been abraded; but the aqueous is not coloured. Fluorescin injected into the blood-vessels colours the aqueous, but does not stain the cornea, even where the endothelium is abraded. If, however, paracentesis is done a few times and the cornea is then excised, the endothelial defect will be found green, but not so coloured as when the fluid was dropped into the conjunctival sac. v. Hippel believes the staining fluid must work from the surface by diffusion in order to show endothelial defects, and not from the aqueous outwards. Fluorescin stains the cornea in the keratitis parenchymatosa resulting from ligature of the venæ vorticosæ (Koster's experiments repeated by v. Hippel). In all but the mildest of these cases endothelial lesions were evident microscopically, and v. Hippel concludes that the keratitis is produced by a primary lesion of the endothelium in these cases. The keratitis of hereditary syphilis in man, on the contrary, is not the result of such enthothelial lesions.

In the discussion, Siegrist observed that the experiments agreed with his own. When the long ciliary arteries are divided, the corneal opacity spreads partly from the limbus as a fibrinous, albuminous exudation, and partly from the posterior surface, where the endothelium dies within two days of the operation.

Stoelting, Axenfeld, and Wagenmann took part in the discussion.

Pathological Anatomy of the Cornea.—Ernst Hertel (Jena). Microscopical examination of recent progressing ulcers shows destruction of the corneal corpuscles with proliferation of those adjoining the necrotic area. Therefore the corneal corpuscles take an active part in the inflammatory process.

The Occurrence of Glycogen in the Eye.—F. Best (Giessen). Glycogen is a known constituent of carcinomatous tumours, and in three out of six chorioidal sarcomata Best detected its presence, while it was absent in a retinal glioma, a conjunctival sarcoma, and two sarcomata of the orbit. He finds it regularly in suppuration and ulceration of the cornea, iridocyclitis, suppurative hyalitis, panophthalmitis ; also in cases of simple retinal degeneration, where the glycogen is certainly the product of the pigment epithelium and the retinal cells.

Phlyctenular Ophthalmia.—Th. Leber (Heidelberg). That there is a connection between phlyctenular inflammation and scrofula is undeniable, but so long as we are ignorant of what the latter with its indefinite relation to tuberculosis really is, purely clinical observation can lead us no further.

The classification of phlyctens as eczema gives us no insight into the pathology, as the dermatologists are still "at loggerheads" over eczema. The skin eruption so frequent on the cheeks in phlyctenular ophthalmia must not be confounded with the conjunctival phlyctens, as it is probably due to infection from the secretion of the latter. Leber has shown that this skin affection can be induced by infection from the cocci cultivated from the eye without skin abrasion, but that the same cocci are inactive on the conjunctiva even after abrasion of the epithelium. It is also probable that other eruptions of ectogenous origin affecting both skin and eyes exist which are not at all of the same nature as phlyctenulæ, but are often confounded with them. Leber has excised conjunctival phlyctenulæ in six cases, and finds in the first place that neither on the surface, nor in the epithelium, nor beneath it, is there any evidence of the presence of microorganisms. He concludes, therefore, that the disease is not due to any ectogenous coccus invasion. Secondly, he has never found any vesicle, but always a solid mass. This is in accord with the observations of Iwanoff, Wagenmann, Hertel, and others, as well as with his own published last year. (In opposition to this, v. Michel asserts that the affection has a vesicular stage.)

Microscopically the phlycten is not simply a collection of multinuclear leucocytes, but contains giant cells which form an important element of the structure. Histologically, the phlycten has a certain resemblance to tubercular tissue. The endothelium of the blood-vessels exhibits proliferation, nuclei increased in number, cells projecting into the lumen of the vessel, and mitoses more numerous than in the other tissues. All this speaks for an endogenous origin for the phlycten, as has been advocated by

Baas. Therefore, clinically the phlycten appears as a manifestation of scrofula, and anatomically it exhibits a somewhat tubercular structure. But it is certainly not a true tuberculosis, due to the action of living tubercular bacilli. Possibly it may arise from the action of dead bacilli, and Leber has experimented to observe the effects of the injection of sterilised tubercular bacilli into the cornea. The results were as follows: The bacilli were rapidly taken up by leucocytes, which in some cases produced a migration of the bacilli through the tissues. When the injection was made in the centre of the cornea a dense cellular infiltration of the wound, with a grayish zone around it, was the result. This was followed by a small loss of substance, which was gradually restored with more or less vascularisation. Recovery, however, was followed by fresh outbreaks of inflammation with punctiform projecting infiltrates. The eye was more or less irritated while this inflammation lasted, and in three cases ectropion occurred, probably from a hyperplasia of the Meibomian glands.

When the injection was made at the corneal margin it was followed by a brawny infiltration with delicate vascularisation, which spread towards the centre and also along the border, and which finally cleared up. Leber's experiments upon the important subject of the action of sterilised bacilli when introduced into the blood-vessels have not yet been successful. His observations go some distance towards explaining such facts as (1) the occurrence of a benign superficial disease like a phlycten in subjects who are tuberculous, or are suspected of being so; (2) the circumstance that the tuberculosis in these subjects may be healed, or latent, and that they do not react to tuberculin; (3) the experience that in such apparently healthy individuals an attack of an acute exanthem may set up not alone tuberculosis, but also recurring phlyctenular attacks.

In the discussion, v. Michel argued that his case of typical eczema was not at all exceptional in phlyctenular inflammation. Axenfeld and Wintersteiner also spoke, and Leber replied.

Stimulation of the Retina by Venous Pressure.—C. Hess (Würzburg). The phosphenes induced by sneezing, coughing, &c., have long been known, but Hess finds no explanation has been given since that of Charles Bell in 1823, which attributes them to the pressure of the lids. This is not correct. The phenomenon is best studied by exercising forcible expiration with the head dependent, and with the effect in one eye obviated by pressure on the globe. The sensations in the other eye can then be observed more accurately. Under these conditions Hess observes four isolated bright spots, one in each quadrant of the field, which correspond to the situation of the four venæ vorticosæ. (See OPHTHALMIC REVIEW, 1902, p. 54.)

(*To be continued.*)

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, JUNE 12, 1902.

The President, Mr. DAVID LITTLE, in the Chair.

CARD SPECIMENS.

Indirect Contusion Injuries of the Left Eye Causing Blindness.—Major M. T. Yarr, R.A.M.C. The patient, aged 25, had been wounded near Klerksdorp, Transvaal, in February of this year, by a Mauser rifle bullet (most probably soft-nosed), fired at close range. The bullet entered half an inch below the external palpebral angle on the left side, passing through the left superior maxilla below the orbit, through the middle nasal fossæ and right superior maxilla, and coming out on the right side an inch below and half an inch in front of the external palpebral angle, the wound of exit being much lacerated and consequently causing cicatricial ectropion. When the bandages were removed a fortnight after the injury the patient found he was blind in the left eye. At the present time the left pupil is dilated and immobile; some perception of light exists upwards and inwards.

The optic disc is pale, and below it is a large, wedge-shaped, raised, white area with radiating processes and much surrounding pigment disturbance; over this area the retinal vessels are tortuous, running about halfway down over the patch, then disappearing into its wool-like surface. Two large hæmorrhages are seen on the patch itself, and several smaller ones in the surrounding retina. There are opacities in the vitreous.

Major Yarr considered this case to belong to the class of "Indirect Gunshot Injuries," described by Mr. Nettleship in a paper in last year's *Transactions* (p. 102). "Injuries in which the passage of a bullet through some part of the orbit is followed immediately by free bleeding into the vitreous, and as this clears up, by various and mixed appearances of choroidal rupture, choroido-retinal exudation, and changes at the disc." In this particular case the bullet passed below the orbit, there being no injury to the sclerotic, and had produced these changes presumably by vibration of tissue particles in the adjacent eye.

Sections from a Case of Microphthalmos.—Mr. H. J. Parsons. These were sections of the left eye of an infant 10 weeks old; the eye had exhibited no normal reflex, but showed a yellow mass lying close behind and in contact with the lens. The antero-posterior, transverse, and vertical diameters all measured 15·5 mm. No abnormality was present, other than the general diminution in size of the globe. The sections showed microscopically: Cornea normal, anterior chamber good, angles patent, and showing the typical fœtal condition of the ligamentum pectinatum iridis, with well-developed spaces of Fontana as in the lower animals. The canal of Schlemm was large and open; the iris and ciliary body normal; the ciliary processes long and thin and nearly touching the lens at, or in front of, its equator. Some fine fibres were seen stretching from the ciliary processes to the lens, and also into the mass of tissue lying behind it; some of these fibres were nucleated. The lens itself showed the central parts of the posterior capsule to be wavy and broken up by the tissue covering its posterior surface; the cortex was badly developed, showing swollen and nucleated cells and fibres arranged irregularly; the nucleus was homogeneous, with nucleated cells. Behind the lens and in close apposition with it was a lenticular-shaped mass of dense, cellular, connective tissue richly supplied with blood-vessels, and from the centre of this mass there projected posteriorly a pyramid containing a patent hyaloid artery with blood corpuscles in it. The vitreous was composed of a loose network of non-nucleated fibres. The optic disc showed an eccentrically placed projection containing the hyaloid artery. The retina at the pars ciliaris showed evidence of arrested development, and in places was seen to be in contact with the mass behind the lens; there was also marked thickening of the sclera.

Rodent Ulcer of the Face, Involving the Upper and Lower Lid; treated by X-rays.—Mr. Stephen Mayon. The patient, a man, aged 53, a carpenter by trade, noticed a small pimple on his right ala nasi twenty-nine years ago, which increased in extent, became ulcerated with very vascular edges, and continued to spread, though removed three times; the last operation took place twelve years ago. When the patient was admitted into hospital in January of this year there was a large irregular ulcer involving the whole of the right side of the face, both sides of the nose, and the conjunctiva of the right eye, together with both lids. The ulcer occupied the surface of a hard, raised, nodular growth, which was firmly adherent to the underlying bone, and which the microscope proved to be typical rodent ulcer. It had also caused ectropion of the right lower lid. Since January 5 he had had daily sittings of five minutes' duration of exposure to X-rays with a 5-ampère current, only the part affected by the growth being exposed, the rest of the face meanwhile being covered by a metal mask (of lead sheeting). In three weeks' time the raised growth had disappeared and the epithelium had started to grow in from the healthy skin at the edges. During the treatment microscopic examination showed that the epithelial cells from the ulcer were undergoing degeneration, and that there was a considerable leucocytosis round them. After some time the hair on lip and eyelashes began to fall out ; 65 exposures were undertaken in all, 50 with the eye closed, 15 with it widely open ; a certain amount of conjunctivitis was thus caused, but no changes in the fundus. The condition at the present time was most excellent, there being considerable scarring with eversion of the lower lid, but only a very few points of the disease remaining.

A Case of Trachoma treated by X-rays.—Mr. Stephen Mayon. The patient was a girl, aged 14, whose left eye, five years ago, became painful to light, and the sight became defective ; six months later the right eye was also attacked. When admitted into hospital on April 5 of this year, the upper lid and both fornices of the left eye were covered with large typical trachoma granules, with one cicatricial band. There was some muco-purulent discharge, and the cornea was covered by a thick, fleshy pannus with one focus of ulceration at the lower inner part ; the pannus was most dense above. The right eye showed a similar trachomatous condition, though the granules were not nearly so numerous and the pannus not so dense ; it only covered the upper third of the cornea. On April 11, exposures of three minutes' duration to the X-rays with a 4-ampère current at a distance of 9 inches were commenced. For this purpose the upper eyelid was everted and the lower pushed up so as to cover the cornea, and to expose the affected area as much as possible. After 22 exposures in all, the patient was discharged cured on May 30. At the present time all the granules have disappeared and the cornea is practically clear of pannus except at the upper part, where it is densest ; no trace of the ulcer remains. The eyelashes began to drop out and some conjunctivitis was set up before the exposures were discontinued. The right eye, which had been treated with copper sulphate, had not improved to nearly the same extent.

Partial Embolism of the Central Artery of the Retina in a lad of eighteen years.—Mr. Arnold Lawson. This patient had become accidently aware that he was unable to see with his left eye as well as he could with his right ; he found he could not see anything above the level of his eye when the right was closed. This condition has remained as it was when first noticed: R. vision $\frac{6}{6}$, L. vision $\frac{6}{6}$. With the ophthalmoscope the upper half of the left disc is normal in colour, but the lower half very pale. The lower divisions of the central artery appear very much attenuated, the inferior temporal branch being reduced to a mere thread. The lower retinal vein appears of good size and seems to carry a good supply of blood. The lower part of the retina is not markedly pale, probably because of the collateral circulation, though no cilio-retinal vessels were visible. The field of vision is only half its normal size, the lower half being full, but the upper absent. There was no history to account for the condition, the cardiac and renal systems being normal, there was no specific history and the patient had always enjoyed good health.

Thrombosis of the Retinal Veins; Cystic Degeneration of the Retina at the Yellow Spot. Vessels of New Formation on the Anterior Surface of the Iris.—Mr. W. T. Holmes Spicer showed microscopic sections illustrating these conditions.

PAPERS.

A Case of Secondary Carcinoma affecting both Eyes.—Mr. W. C. Rockliffe read a further note on a case shown before the Society on July 5, 1901, with four cystic-like detachments of the retina of left eye. The patient was a woman, aged 46, who had been kicked by a cow on the right breast thirteen years previously; this injury was followed by a mammary abscess and considerable trouble after it for a year or more. The breast was several times after this injured by blows, and in 1900 it was removed, on account of carcinoma. Some months afterwards the patient noticed that her vision was misty and very defective, but there was neither pain nor redness of the eye. Her eyes were first examined six months after removal of the breast; the vision in the left eye was then finger-counting at four inches; the pupil was sluggish, but perception of light was good; there was intense optic neuritis with hæmorrhage into the disc, and the whole retina loose and detached in the lower quadrant. In the right eye vision with sph. + 2·5 was $\frac{6}{6}$ and Ja. 1. There was no neuritis, only a general hyperæmia of the disc, with congested veins.

A fortnight later the detachment of retina in the left eye had increased, and a month later still the vision was reduced to perception of light only, with four large distinct translucent cystic detachments of the retina filling the eye. A month later the right eye showed a very pink disc, congestion of the veins, and detachment of the retina at the extreme periphery. There was no enlargement of the lymphatics.

On July 12, 1901, the left eye was excised, and on being examined showed a flat, unpigmented growth situated in the choroid, which at the disc margins was thickest (from 2 to 3 mm.), becoming thinner as it advanced towards the anterior part of the globe. Microscopically it proved to be carcinoma in the choroid, which also invaded the optic nerve, the retina at the margins of the disc, and the sclerotic at the posterior pole of the globe.

On July 30, the right eye had vision $\frac{6}{18}$. The detachment had greatly increased. On August 16, the patient experienced severe pain in the left axilla and breast, especially on taking a deep breath; pleurisy was diagnosed. On August 30, swelling and pain came on in the left leg.

On September 10, the vision in the right eye was $\frac{6}{12}$ and Ja. 1 with difficulty; under atropine the fundus was examined, and the optic disc found to be very red and swollen; there was a large detachment of the retina present. Death took place on November 30. The disease had thus become general during a period of three and a half years from the date of the last injury to the breast. From the first affection of the eye till death a period of nine months elapsed.

In reviewing the case, Mr. Rockliffe referred to the report of twenty-four cases by Mr. D. Marshall, in the R.L.O.H. Reports (vol. xiv., part 3, of December, 1897). With reference to the tension of the globe, in this particular case the tension remained normal, and out of the twenty-four cases recorded by Mr. Marshall, the tension was normal in eleven cases, + in seven, — in four, and not recorded in eight; he accounted for there being no rise in tension by the fact that the growths were very flat and spread out; being very thin, they had not caused protrusion forwards of the lens and iris or blocking of the angles. He reported that as a rule the subsequent duration of life after the eye has become affected was from one month to two years. Mr. Marshall considered that carcinoma of the eye is usually preceded by injury and by carcinoma of the breast.

In the discussion which followed, Mr. W. T. Holmes Spicer said he had seen recently a case which bore out Mr. Rockliffe's. Scirrhus of the breast, followed in two and a half years by dimness of vision in one eye, with two large detachments of the retina, and the tension not increased. The eye when removed showed a flat, shallow scirrhus.

Mr. Hill Griffith stated that carcinoma was flatter than sarcoma when in the eye, but thought that if sarcomata were seen early they would present much the same appearance as carcinomata. He had seen one case of very flat tumour in a glaucomatous eye, which turned out to be sarcoma.

Mr. Devereux Marshall stated that carcinoma in the eyeball spread out laterally and was not heaped up. Altogether he thought that secondary carcinoma in the eye was perhaps much more common than is usually supposed to be the case, because the defect in vision of a person dying from carcinoma was, as a rule, put down to general weakness, and often not to its true cause—a new growth in the eye. He had never seen carcinoma grow through the sclerotic.

Leprous Ulcer of the Cornea.—Mr. W. C. Rockliffe read notes of a case. The patient, a man, aged 21, a native of Demerara, had been treated for leprosy when 15 years of age, in 1886, in Demerara. He came to England in 1897, in 1898 he burnt his left hand, which subsequently became deformed, the first and second carpal joints becoming extended, the third flexed. In 1900 he suffered from a perforating ulcer of the sole of the right foot, which, however, was practically painless; the fingers of the right hand commenced to flex also. In 1901 he damaged his left hand without experiencing much pain, and after this the terminal phalanx of the fifth finger dropped off. In 1900 there came on ectropion of both lower lids, and in 1901 an ulcer formed in the right cornea, the cornea itself being completely anæsthetic. At this stage of the disease the patient showed areas of leucoderma, elephantiasis of right leg, and a crumpled-up condition of both hands and feet, perforating but painless ulcers of the latter, and bleaching of the skin. The nerves, where superficial and capable of being felt, were enlarged, and rolled under the finger. The hands and feet were greatly deformed, owing to wasting of the muscles and destruction of bones. In the hands the terminal phalanges were unaffected, with the exception of the left middle finger and the left fifth, whose terminal phalanges were absent, owing to spontaneous amputation. In the feet, the terminal phalanges were unaffected, but the fourth and fifth metatarsals of left foot were partially absorbed. The case was considered to be undoubtedly one of anæsthetic or trophi-neurotic leprosy. The corneal ulcer was three times scraped, cauterised, and carbolised, but was very stubborn, resisting all treatment for a long time. He quoted from "Diseases of the Skin," by Jamieson, of Edinburgh, to the effect that "the cornea is specially apt to have tubercles form in it, and the sight is usually lost, while the optic nerve may become secondarily affected in the mixed variety." In this case a dense, fibrous leucoma resulted after the healing of the ulcer in the cornea. No bacilli could be cultivated from the scrapings.

Several good skiagrams of the bony changes in hands and feet were also shown.

Supposed Death from Atropine Poisoning.—Mr. W. C. Rockliffe. An infant, aged 10 months, was admitted to the Hull Infirmary on May 20, with congenital cataract. It was a sickly looking infant, one of a family of twelve, and had had convulsions the greater part of its life. The pupils being small and responding feebly to light, 3 drops of atropine solution (4 grs. to the oz.), only partially dilated them, so more atropine was instilled in order to dilate them fully for operation. The child had a peculiar vacant look, and was considered likely to have convulsions.

On admission, May 20, the temperature was normal ; the child had an erythematous rash on its legs. One drop of atropine was instilled into each eye.

May 21, 8 a.m., child well, taking its food well ; 1 drop of atropine. 12.30 p.m., flushed, temperature 102·2° ; twitching, lips and mouth dry. 5 p.m., temperature 103·6° ; drowsy. 8 p.m., refused milk ; pulse uncountable. 8.50 p.m., death. The child altogether had had 7 drops of atropine solution, equal to $\frac{1}{17}$ of a grain in thirty hours. Neither convulsions nor delirium occurred. At the autopsy nothing abnormal was found except a few hæmorrhages on the liver and pleura.

Mr. Rockliffe considered it doubtful whether atropine had been the cause of death. He quoted from Guy and Ferrier with reference to poisoning by atropine: "Usually a scarlet rash, dry skin, accelerated pulse and respiration, occasionally nausea and vomiting. Delirium generally a very marked symptom," also "the symptoms may set in within half an hour from the time of taking the poison," and with reference to the dose, "children are relatively less susceptible to the toxic action of belladonna, less than 1 grain of atropine has produced serious symptoms and 2 grains have proved fatal."

Two Families with Congenital Microphthalmos and Cataract.—Mr. A. Bronner read notes of the cases. In the case of one family the father and four out of eight children were affected ; in the other family the mother and all four children. In most of the patients cataract and nystagmus were present, with sometimes coloboma of iris and choroid.

Of the first family, the father, aged 48, had microphthalmos, cataract and lateral nystagmus from birth. No other member of the man's family was affected. The cataracts were both extracted, but with the correcting glasses barely $\frac{6}{60}$ vision obtained. He had eight children, of whom the first was still-born, but its eyes were not in any way affected. The eldest boy, now aged 21, had normal eyes ; the next, a daughter, aged 18, had microphthalmos, cataract, nystagmus and convergent strabismus of the left eye ; although the cataract was removed the vision still remained very poor. The fourth and seventh children had normal eyes. The fifth, sixth and eighth all had microphthalmos, cataract and nystagmus. The eyes and cornea were very small, the anterior chamber shallow ; no coloboma of iris or choroid existed.

In this family there was no history of excessive drink or of syphilis ; there was no consanguinity of parents ; the mother's eyes were normal. Of the second family, the mother had bilateral congenital microphthalmos, cataract, and nystagmus. Her right eye had been lost after cataract extraction. There were four children, two girls and two boys, of whom two were dead, the eldest living child being five years old. All of them had bilateral microphthalmos and cataract ; and two had likewise nystagmus and convergent strabismus. The irides were normal. The cataracts in all had been removed, but the vision remained very defective. The mother of the mother of this family was reported to have had similar eyes to her daughter's, "very small and which were always on the move and the vision very bad."

In the discussion which followed the reading of this paper, Mr. Priestley Smith asked what was the line of demarcation for microphthalmos? how small must an eye be to merit the term? He stated that the average eye measured from 24 to 25 mm. in diameter and the cornea 11½ mm., but that nevertheless quite healthy eyes could be found whose cornea measured only 10½ mm. in diameter and sometimes only 10 mm. He also pointed out that if the eye was smaller than normal there was apt to be cataract, which likewise appeared to diminish the risk of glaucoma. He also said that even if the lens were normal in diameter it might be too large for such an eye, which accordingly became glaucomatous, but should it become cataractous the risk of glaucoma was lessened. As to microphthalmos being hereditary, he reported a case of a woman with eyes of only 10½ mm. diameter who had primary glaucoma, and from this cause lost one eye. The woman's father had the same condition of microphthalmos, not associated with cataract but with glaucoma. Dr. Argyll Robertson said that many years ago a boy of six or eight years old was brought to him with cataract and marked microphthalmos, the diameter being only about two-thirds the normal. On one occasion the boy's father came with him, and was found to have the same condition as regards the size of the eyes, but with the difference that the boy had nystagmus and the father not. He thought that according to Mr. Priestley Smith's view there might be in such eyes less chance of glaucoma supervening, yet it must always be remembered that the congenital defect of formation also gave rise to very defective sight, and that whereas in the one case by operating for the glaucomatous condition a better result as regards the tension might be obtained, yet in high degrees of microphthalmos they had the counterpart of the defective formation of the eye in the shape of very imperfect vision. This was the only case of inherited microphthalmos he had seen.

He also stated later that in another case a man who had lost one eye through an injury, married a blind girl and the two had a microphthalmic child, one of whose eyes was so extremely small that it almost became a case of anophthalmos, and this he said looked as if there was some hereditary influence at work.

Dr. Mules asked if Dr. Bronner had traced back the history in order to ascertain the cause of the condition. He had seen two cases of microphthalmos within a very short time, in each of which there was undoubted evidence of congenital syphilis. From this he thought it not unlikely that in all cases there was some far-away syphilitic taint acting as the starting point of the affection.

Mr. Adams Frost asked whether the presence of the original coloboma of the iris did not rather diminish the prospect of glaucoma, and whether Dr. Bronner had seen glaucoma come on in any case of microphthalmos in which coloboma of the iris had also been present.

Professor E. Fuchs (Vienna) stated he had only seen one case in which there was inherited microphthalmos, both in the father and in the son, and in each in one eye only. He did not remember whether cataract was present or not. He recollected one case in which a man who had lost one eye in early childhood from acute blenorrhœa and now had a shrunken eye, married, and a son who also had microphthalmos on the same side; but he considered this might be mere coincidence, and thought that a number of such cases should be collected before we are justified in the conclusion that the microphthalmos was due to the loss of an eye in the parent. He stated that when carrying out inoculation experiments with tubercle bacilli on the eyes of rabbits, in cases where the rabbit's eye was destroyed and the rabbit had young ones later, the young had been found to have microphthalmos and coloboma, so he considered it not impossible that acquired loss of an eye in the parent might be transmitted to the children in the form of microphthalmos.

Dr. Landolt (Paris) said he had no experience of the condition under discussion and not even an idea as to the inheritance of microphthalmos, but considered it possible.

Dr. Bronner, in reply, said that in the first family there was no suspicion of syphilis, but in the second it was possible, though there was no history. There was neither coloboma of iris nor of choroid, in any of the cases.

Colloid Degeneration of the Conjunctiva.—Major H. Herbert, I.M.S. The patient, a woman, aged 50, suffered from considerable thickening of the conjunctiva, and consequent discomfort. The ocular conjunctiva alone was affected: the palpebral portions were occupied by scar tissue, the result of old trachoma. There was entropion of the upper lid of the right eye, and the left lid had been similarly affected but had been operated upon. Both corneæ were semi-opaque from pannus. The conjunctiva in each eye was much swollen and yellowish, and there was a loose fold overlying the upper third of the cornea. The swollen conjunctiva in the right eye was opaque, with white patches in it, in the left it was translucent, and showed only one patch about 5 mm. in size lying above the cornea. On examination this was found to be a firm, wax-like nodule, which shelled out readily from the very soft surrounding tissue. A touch from a probe caused free hæmorrhage from these folds, but when these were removed later on by tearing no hæmorrhage occurred. On histological examination the following conditions were found : (i.) The epithelium was thickened from swelling of the cells, not from any increase in the number of them. Large mucous cells were present. (ii.) Below the epithelium was a mass of lymphoid tissue, which is quite an abnormal condition in the ocular conjunctiva. The cells were widely separated, and between them was present much swollen tissue in masses representing the fibrous tissue (Collagen) as in callous degeneration of the skin (*vide* Unna's "Histo-pathology of the Diseases of the Skin"). (iii.) In the deeper tissues there were more colloid changes in the shape of free blocks of colloid, and in the centre of some of these were cavities filled with golden blood pigment. (iv.) The coalescence of colloid into larger masses corresponding to the large, firm, waxy nodules seen clinically, each of which consisted of (1) a compact centre and (2) a loose periphery. In (1) no trace of blood-vessels could be found, only the remains of cells, and in (2) the colloid was placed more in strips and layers than in masses.

He considers that "amyloid" is not a true designation for this condition since (*a*) the staining reactions appear only secondarily to the so-called hyaline change ; (*b*) only a few of the blocks gave a faint indigo-blue tint with iodine and sulphuric acid ; (*c*) colloid suggests the origin of the smaller masses from normal collagen.

Reported by R. E. BICKERTON.

COMBINED BAR-READER AND SQUINT STEREOSCOPE.

BY E. E. MADDOX, BOURNEMOUTH.

THIS instrument is intended to be placed in the hands of a patient. A saw-cut (A) is made round the lenses of a Holmes stereoscope, and two hinges (H) put on so that the oval of wood containing the lenses can fall down out of the way when the instrument is used for bar-reading. Two shutters of talc or mica (B) are pivoted into saw-cuts, and are scratched by gentle gradation more and more strongly from one edge to the other, so that by rotating them vision can be reduced or increased by imperceptible degrees at

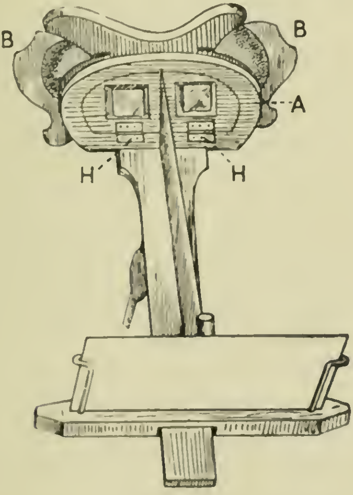

FIG. 1.

pleasure. For bar-reading these are not used, and the arrangement is as shown in fig. 2, except that the oval flap containing the lenses is thrown down out of the way on its hinges (H). One cross piece carries a series of vertical bars, while on the other is placed a piece of paper, closely type-written with letters and figures which the patient is required to read without skipping any (fig. 2).

The scalloped screen for the forehead makes the Holmes stereoscope admirably adapted for this purpose, since the head cannot easily be moved to dodge the bars. Though this exercise does not necessarily impart stereoscopic vision, it teaches rapid alternate vision, which prepares the way.

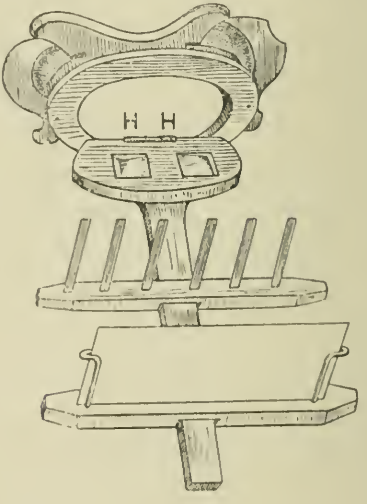

Fig. 2.

As regards the talc screens there are two ways of using them. If a distant object be chosen, the prisms are thrown down, and both cross pieces removed. The candle or other object is then fixed with the squinting eye, while the vision of the best eye is cut off by the densest part of the screen in front of it. This screen is then slowly raised so as to gradually restore more and more vision to the better eye, while the patient is encouraged to make every effort to retain the image seen by the squinting eye. At a certain moment the better eye will suddenly resume fixation, and the proceeding should be repeated. After a little practice, this reversion to the better eye can be overcome by an effort of the will, and the squint becomes one that alternates at pleasure. If any tendency to binocular vision exists, the eyes are now in a position to unite their double images, provided the squint has been put nearly straight by operation, or correction of the refraction.

The second method of using the stereoscope is in near vision, with the employment of Javal's cartons, and other stereoscopic devices. For this the prismatic lenses are raised into their places and the further of the two cross pieces shown in fig. 1 is placed in position. By gradually depressing the talc shutter before the best eye it can be handicapped more and more till the squinting eye becomes visually its equal, and attempts fixation. As soon as it succeeds, the handicap can be withdrawn by degrees day by day. One great disadvantage hitherto of all open *adjustable* stereoscopes has been the partial nature of the median partition which, in no instrument I can find, stretches the whole length to the card-carrier. I have overcome this by the introduction of a broad extensible ribbon, one end of which is fastened to the little hook between the lenses, while the other end curls round an elastic string, or a vertical spring bar which may be placed in a hollow post on the middle of the card-carrier. The same device would doubtless be of service for ordinary adjustable stereoscopes, but in their case the coil should be at the end next the lenses with only a simple wire post standing up on the card-carrier.

For the principle of bar-reading, we are, I think, indebted to Javal, while Bull first introduced a carrier to rest against the face.

REVIEWS.

E. HAITZ (Heilbronn). Four Cases of Disease of the Central Artery. *Beiträge zur Augenheilkunde, April*, 1902.

VAN DUYSE (Ghent). Simultaneous Embolism of the Central Artery in both Retinæ. *Archives d'Ophtalmologie, April*, 1902.

Haitz discusses the differential diagnosis between embolism and endarteritis proliferans, which his first three cases illustrate. The first was that of a girl of nineteen whose left eye became blind during the night and who was seen at hospital next morning. There was no history of former illness or of prodromal attacks affecting the eyes, but on examination, an insufficieny of the mitral valve was found. The fundus of the affected eye showed typical œdema with a cherry red spot at the macula. The vessels were of normal size, and circulation was maintained, as proved by the production of venous pulsation on pressure. The interest of the case lay in the appearance of a white egg-shaped structure occupying the whole width of the lower main arterial branch, close to its origin at the centre of the disc. The prominent end of this structure seemed to lie at the very origin of the lower main artery when its direction was from behind forwards, so that the centre of the structure occupied the bend at the margin of the physiological cup. Its distal end was convex, projecting into the distal column of blood, whose apparent limit was therefore concave. This is a point specially insisted on in view of a diagnostic sign pointed out by Reimar, namely, that an embolus would naturally present this shape, at any rate at first, whereas the distortion of the blood column produced by endarteritis would be the reverse, namely, a red cylinder fading off into a single point, a pointed convexity.

A paracentesis was immediately performed and vision was apparently improved. After this it improved steadily until in less than three weeks from the time of the original loss of sight it was restored to $\frac{6}{6}$. At the same time the appearance of the embolus—for such, based on its shape, was the diagnosis—was changed. Instead of occupying the whole lumen of the artery, it now left a free channel on one side and presented the appearance of a thickening of the opposite wall, while the actual bend of the artery which had at first been occupied by the embolus was now apparently free.

The difficulty of accepting the diagnosis of embolism in this case lies in the facts, first,—that the circulation even within twenty-four hours of the attack, appeared to be normal, and second,—that a practically complete recovery ensued, an occurrence the possibility of which in cases of true embolism is denied by some authorities. The author proposes a purely mechanical explanation, which, if it is correct, explains both these difficulties. It is based on the not unlikely supposition that the embolus consisted of a flat ovoid structure which, instead of being rigid, was flexible. Arrested at first at the forking of the main artery, it blocked, for a time, the entire circulation, and temporarily destroyed the function of the whole retina. Before there was time for the destruction to become permanent, however, and before the secondary thrombosis could become organised, the force of the blood pressure from behind altered the shape of the embolus and in so doing caused its position to be changed, pressing it onwards into the lower main branch and forward against its anterior wall, thus allowing sufficient blood to pass to restore the circulation at once and the retinal function by degrees. In such a position the obstruction, viewed by the ophthalmoscope, would appear to occupy the whole width of the artery, and it was at this stage that the patient was first examined. The subsequent alteration, by which the obstruction was apparently pushed to one side and a visible blood stream restored, is similarly explained. Granted that such an embolus might persist without the gradual increase of secondary thrombosis, the author's explanation seems to satisfy the conditions in this case. The point which needs answering is: can a foreign body persist in an artery for an indefinite time without the occurrence of secondary thrombosis sufficient to block the vessel ?

The second case presents no peculiar interest. The diagnosis of endarteritis, rather than embolism, rested on the fact that a temporary obscuration of vision, similar in character to the permanent one, had occurred a week previously.

The third case was also one of endarteritis. It occurred in a woman aged 39, with no indications of a syphilitic taint, but with signs of general arterio-sclerosis. It presents many points of interest. After some temporary obscuration of vision, a sudden blindness of one eye occurred synchronously with the beginning of menstruation, a history which suggests that a rapid fall of general blood pressure may have had something to do with it. A second interesting point is that between the first and the second ophthalmoscopic observations, which took place respectively one and two days after the discovery that the eye was blind, a remarkable change in the fundus took place. On the first occasion the only artery which appeared markedly abnormal was the lower temporal, in which in part of its course the blood column was broken up into sections like a string of pearls, which now and then showed to-and-fro movements. On the second occasion this vessel appeared to be full of blood, but on the other hand, the commencement of the lower main arterial branch from the central cup to nearly the margin of the disc appeared to be absolutely bloodless, though transparent, and this though further on the arterial branches, including the one which the day before had been blocked, were apparently normally filled. A similar appearance was observed in an artery going to the nasal side, except that this was not so transparent. The explanation suggested is that a swelling of the intima existed at several different places, that the variable appearance of the arteries at different times was due to variations in the arterial relatively to the intraocular pressure (a paracentesis had been performed between the first and the second observation) ; further, that in the transparent and apparently bloodless portions of the artery there was really a circulation going on through an extremely narrow slit—so narrow that the blood was as transparent as it is under the coverslip of a microscopic slide. In the less transparent artery a thrombus may have been formed.

The fourth case discussed in this paper belongs to a different category. It is that of a girl aged 17, subject to atypical but definite attacks of migraine, in whom certain fundus changes were noted and connected by the author with these attacks. These changes consisted in the narrowing of portions of the branches of the upper main artery of the left retina, with signs of retinal degeneration in the area of its distribution. The artery in question had an abnormal origin from the margin of the disc, and before its bifurcation was sharply bent round a vein. The author's theory that a spasm affecting the whole ophthalmic artery would especially affect this branch, because of the sharp bend, seems a tenable one to account for the ocular symptoms, but the connection between this and the permanent narrowing in calibre, together with signs of retinal degeneration and slight optic atrophy, is not so evident. The hypothesis put forward that there may have been a temporary thrombosis is hardly satisfactory, for how could this have affected the retina so slightly as to leave central vision of $\frac{6}{6}$, together with a field hardly, if at all, contracted ?

The somewhat sensational title of the paper by van Duyse, of Ghent, is hardly justified by its contents. Considering how comparatively few cases of obstruction of the central artery can, in the light of modern criticism, be accepted as proved cases of embolism, the occurrence of simultaneous embolism of the two central arteries is so exceedingly improbable an event that before venturing such a diagnosis the very strongest proof should be brought forward. In the present case this is far from being done. That an old man of 71, struck with sudden blindness in each eye at an interval of three minutes, should fail to recall any prodromal symptoms affecting either eye separately is by no means sufficient proof that the case was one of embolism. The ophthalmoscopic picture typical of embolism applies equally to any other cause of obstruction. The fact that he was an old man with atheromatous arteries points rather to endarteritis obliterans as the cause. That he had a chronic valvular endocarditis is hardly in favour of the theory of simultaneous embolism at a time when there was no reason to suppose that this disease had taken on an acute form. On the other hand, endarteritis obliterans is a disease which would be likely to attack various arteries, and in a case where the central artery in each eye was affected by it to such an extent as to reduce the lumen to a mere slit, a considerable, or even a slight, fall in general arterial blood pressure, such as might not improbably occur in an old man at any time, would be sufficient completely to arrest the circulation at the particular spots.

A. Hugh Thompson.

SCHIMAMURA (Japan). Endogenous Toxic Wound Inflammation in the Eye: Does it Exist? *Klinische Monatsblätter für Augenheilkunde, April*, 1902.

The author criticises the experiments and statements of Tornatola, who considered he had obtained clear experimental proof of the existence of such an inflammation. The method of experimentation practised by Schimamura was to produce a severe traumatism in the eye of a rabbit, and then, after subcutaneous or intravenous injections of toxins, to ascertain whether any real inflammatory changes followed in the injured eye. In producing the traumatism the possibility of infection from without was carefully excluded, a fine knife or discission needle being introduced, and then moved about so as to tear the deeper parts, lens, ciliary body, choroid, retina, and vitreous. The results were entirely negative, and the positive results obtained by Tornatola are put down to defective technique and want of asepsis. The toxins used by Schimamura were those of B. pyocyaneus, B. coli, and S. aureus. When an injection of those toxins was made direct into the vitreous very severe inflammation followed.

Schimamura does not, in his conclusions, absolutely deny the possibility of endogenous wound inflammation from toxic influences, but maintains that in the rabbit, at least, there is no ground for believing that the toxins before-mentioned have any such influence.

The investigation was done under the direction of Professor Axenfeld. J. V. PATERSON.

YARR. Manual of Military Ophthalmology. *London : Cassell and Co.*, 1902.

The author, a major in the Royal Army Medical Corps, who has gathered experience in several lands, has written this small manual, a handy compact little volume of 230 pages, chiefly for the use, as its name implies, of army surgeons and Colonial medical officers. It is not meant as a rival to the larger text-books, and Major Yarr asks us in his preface to remember that the aim of his book is a modest one, and that he does not "pose as making an original or weighty contribution to ophthalmic literature. Devoting particular attention, as the manual does, to eye injuries, malarial and venereal eye affections, malingering, the commoner eye operations, &c., it ought to prove a very useful and not a bulky addition to the medical library of those to whom it is more especially addressed. There are, unfortunately, far too many uncorrected printer's errors, which rather irritate the reader.

TRANSACTIONS OF THE HEIDELBERG OPHTHALMOLOGICAL SOCIETY.

AUGUST, 1901.

(*Continued from p.* 201.)

A Little Known Optic Nerve Lesion.—A. Siegrist (Basel). The condition, described at length, must be a very frequent one, as Siegrist observed it in fifty-one eyes out of a total of eighty examined by him. The lesion consists of microscopic and macroscopic changes in the nerves after hardening in Müller's fluid, and is similar to that described by Leber in 1868. Schlodtmann described similar appearances in 1900 in eyes hardened in formol. The diagnosis adopted by Siegrist is destruction and fatty degeneration of the nerve fibres, and he suggests that it may account for many cases of defective vision without ophthalmoscopic signs of disease, such as are seen more frequently in old people.

In the discussion Leber remarked that the changes observed by Siegrist corresponded with those observed by him in a degeneration of the nerve-fibre bundles.

Fuchs expressed the opinion that the changes which have been so frequently observed by all pathologists arose *post mortem*, probably from the effects of hardening fluids. He does not wish to assert that all those described are *post mortem*, Leber's, for instance, but that the majority are.

Wagenmann expressed a similar opinion.

Siegrist, in reply, argued that neither cadaveric changes nor the effect of hardening fluids could account for the appearances on his cases.

The Development of Young Myopic Eyes under full Correction.—G. Pfalz (Düsseldorf). For years back Pfalz has ordered full correction for myopic eyes, and is fully satisfied that the practice is a good one. He observes that the contrary practice of under-correction has been adopted more upon purely theoretical grounds than as a deduction from the results of experience. His practice was adopted in consequence of observing many myopes who had worn full correction with advantage, and he gradually came on in his own practice to order full correction. He does not correct higher than what admits of a relative accommodation of 2·5 D. He considers periscopic glasses essential in the higher degrees of myopia, as pointed out by Ostwalt. Tables are appended which show that full correction has a restraining influence upon the increase of the refraction of myopic eyes.

The full Correction of Myopia.—L. Heine (Breslau). Tables are also here appended to show the benefits of complete correction, but the paper is principally devoted to more theoretical considerations which are in favour of the full correction. The question which the author proposes at the outset is—Can I do harm by ordering the strong glasses which the patient requires to obtain his maximum of vision? Förster came long ago to the conclusion that full correction was not only harmless but useful to the myopic eye. Heine comes to the same conclusion on the following grounds. First, as regards distance, there is absolutely no reason to assume that correct glasses can do anything but good; and then, as regards near objects, harm can only be done (1) by dragging through ciliary contraction, or (2) by increased intraocular pressure. Now the complete proof that has been given of late (Hess and Heine) of Helmholtz's theory of accommodation puts out of court all theories of accommodation that assume an increased intraocular pressure, even if it had not been experimentally proved that no rise of this pressure takes place in accommodation. As regards the drag from ciliary contraction, it has been shown that this affects only the anterior segment of the globe, while it is admitted that the distension in myopia is restricted to the posterior segment, so that no harm can result in this wise. On the other hand, there is no doubt that contraction of the external muscles does increase the pressure, and this is what occurs in looking at objects close to the eyes. It is likely, too, that eyes using the amount of accommodation corresponding to the degree of convergence, are working under more perfect physiological conditions than eyes whose convergence bears no normal relation to their accommodation. We know that the relative accommodation is evenly placed on the two sides of the point of convergence. The above theoretical considerations are fully borne out by the experience of full correction.

Choroidal Changes in High Myopia.—M. Salzmann (Vienna). From the examination of a series of myopic eyes Salzmann concludes that the usual changes seen in the choroidea are in the first place the result of a stretching of the vitreous membrane, which is followed by processes of repair or healing, which start primarily from the pigment epithelium. This regenerative process may over-shoot the mark so that the pigment epithelium spreads through the rupture into the choroidal stroma. From the mesodermic tissues also regenerative processes arise, which impress themselves upon us in the form of inflammatory changes, and which result in the destruction of the blood vessels in the neighbourhood of the original rupture. The healed rupture is a *locus minoris resistentiæ*, and readily ruptures again, and so on.

Discussion on the three papers dealing with myopia :—Dor, Hess, Wicherkiewics, v. Hippel, sen., Straub, Schwarz, Lucanus, Axenfeld, Mayweg, Gullstrand, Fuchs, Krueckmann, Schoenemann, all expressed themselves freely in favour of full correction. No voice was raised against the proceeding, except that Uhthoff admitted that he had not fully made up his mind upon the subject. He had been of those who do not prescribe full correction for near work in high myopia, but his views were not now so definite.

Optic Nerve Lesions in Fracture of the Skull and Hæmatoma of Nerve Sheath.—W. Uhthoff (Breslau). Two cases are reported in which ophthalmoscopic examination and a *post mortem* were both made. In the first case there was paresis of some of the external muscles, sluggish pupils, the left being dilated and the right contracted. Ophthalmoscopically five and a half hours after the injury (a fall on the back of the head) both discs were hazy, the borders indistinct, the papillæ swollen, the veins dilated, the arteries normal in size, occasional venous pulse visible, and vessels of both kinds slightly tortuous. Near the disc several radial retinal hæmorrhages, and some on the disc itself. *Post mortem* there was found, in addition to extensive extradural and intradural hæmatoma, a fracture of the base running from the left temporal bone to the sella turcica. The optic nerve sheaths were filled with blood, the anterior extremity being most distended ; the papillæ were swollen and œdematous, and the appearances were those of commencing " choked discs." Hæmorrhages were found in the papillæ and the neighbourhood, but these blood extravasations had no connection whatever with the blood in the nerve sheaths. The central vessels in the papillæ contained blood. Both eyes presented the same appearances.

The second patient (a man who fell on his head) was examined one and a half hours after the accident. Both globes were somewhat prominent, with paralysis of some external muscles, and inactive pupils. The left disc was surrounded with a ring of large hæmorrhages spreading along the retinal veins ; the arteries were small and tortuous, small hæmorrhages in the macula.

The right eye exhibited less blood extravasation, but the macular region was implicated. In both the periphery was free and tension normal. *Post mortem* the left parietal bone exhibited a star-shaped fracture, and there were numerous hæmorrhages, mostly subdural, with other lesions. The sheaths of the optic nerves were filled with blood just as in the first case, with some blood in one of the orbits. Both papillæ were swollen, œdematous, as in commencing "choked disc," and the retinal hæmorrhages had no connection with the blood in the nerve sheaths. It is interesting to note that in these cases the nerve sheath was full of blood although no fracture of the bony optic foramen had occurred, the fracture of which is the usual cause assigned for the optic nerve lesions in fracture of the skull. It is remarkable with what extreme rapidity the appearances of typical optical neuritis developed themselves. An interesting point again is the fact that the retinal changes were evidently the result of venous stasis, and not at all what we observe in embolism or thrombosis of the central artery. The common form of blindness after skull injuries is that which has negative ophthalmoscopic signs at first, and then exhibits simple atrophy of the nerve. Uhthoff thinks these cases may be about twice as frequent as those like his, which commence as optic neuritis. The paper contains a list of the literature of the subject.

Photography of the Fundus.—F. Dimmer (Graz). The difficulties of photographing the retina are extreme; the reflexes from the media, the intense illumination required, and the red and yellow colours all make against success. Dimmer has attained very fair results, judging from the plates in the published volume of the proceedings, but for a description of his apparatus we must refer to the original.

Siderosis Bulbi.—A. Vossius (Giessen). This paper seems to owe its origin to a statement attributed to E. v. Hippel, to the effect that neither the greenish-brown colour of the iris nor the rusty-brown colour of the cornea is a certain proof of the presence of iron in the eye, as the abnormal amount of iron in the eye may have come from the hæmorrhage occasioned at the same time as the supposed penetration. There is, however, no essential difference between Vossius and v. Hippel. Both are at one with regard to the classical signs of siderosis, discoloured iris, retinal pigmentation, brownish spots on the lens, night-blindness, contraction of visual field, &c. Vossius ascribes the widely dilated pupil which sometimes occurs to a chemical irritation of the sympathetic fibres by the iron in the iris. This may be followed by atrophy, when the pupil will no longer act normally to mydriatics. This theory is based on experiments of Eckhard, which show that concentrated salt solution applied to the cervical sympathetic produces dilatation of the pupil, followed by paralysis of the dilating fibres.

Monocular Diplopia in Astigmatism.—Ed. Hummelsheim (Bonn). The author records three cases of the well-known curious monocular diplopia which is observed occasionally in regular astigmatism. In the first case no defect whatever could be detected in the media except the astigmatism, and the diplopia was proved to be a corneal and not a lenticular lesion, because it completely disappeared when the corneal refraction was neutralised by the "orthoscope" filled with salt solution. Hummelsheim produced a similar diplopia by bisecting an ordinary watch glass and bevelling off the divided edges, so that on being put together the two segments formed an angle open towards the concave surfaces. With this arrangement monocular diplopia (crossed) was produced, and single vision was obtainable by accommodating for a nearer distance than that of the object. The same phenomenon was present in the astigmatic case.

No corneal defect could be detected, so Hummelsheim can only account for the case by assuming that there must be some optical difference between the two halves of the man's cornea, so that each half refracts differently, and that inasmuch as the patient always saw one of the images fainter than the other, one half of the cornea must absorb more light than the other.

In the second case the orthoscope demonstrated also that the cause of diplopia was in the cornea. The third case was not tested with this apparatus.

In the discussion Dimmer stated that diplopia in astigmatism could be accounted for by the combination of the regular corneal astigmatism with the irregular lenticular astigmatism, which is the cause of the common polyopia monocularis.

Gullstrand followed to the same effect; a suitable combination of sphero-cylindrical lenses will produce vertical or horizontal diplopia in any eye.

The Lymphatics of the Lids.—K. Grunert (Tübingen). Injections by Gerota's method show that the lymph vessels of the lids arise from a threefold capillary network, first from a superficial subcutaneous system, secondly from the pretarsal, and thirdly from the conjunctival system, the latter two being those described by Fuchs. All the three are in close connection with each other through numerous anastomoses. The superficial system sends two medial and two temporal branches. The medial branches terminate in the submaxillary lymph glands, and the temporal in the parotic lymph glands. The deeper lymph canals are similarly divided into two groups which terminate in the submaxillary and parotic lymph glands respectively.

Remarks on Tobacco and Alcohol Amblyopia and Reflex Nystagmus.—S. Bernheimer (Innsbruck). Bernheimer has observed in toxic amblyopia at the commencement a distinct redness and haziness of the temporal half of the papilla, with imperfect reflex on the vessels. This is only seen in the erect image, and is accompanied by relative scotoma for red. It is an argument in favour of the theory which classifies toxic amblyopia as a primary partial interstitial neuritis.

Two cases of reflex nystagmus are recorded; the first is not a novelty. In it the nystagmus occurred after long-continued near work in a hypermetropic individual; suitable convex glasses effected a cure. In the second the nystagmus took place when the upper or lower lid was lifted up from the globe. This case, as also the first, suffered from catarrhus siccus, and it recovered when the catarrh was cured.

In the first case we must assume an increased stimulation of the accommodation centre spreading over to other cells of the oculo-motor nucleus. In the second case we may assume that the fibres of the fifth nerve in the conjunctiva are in a state of irritation, which is intensified by the drying of the surface, and spreads from the trigeminus nucleus to the nuclei of the oculomotor nerves.

Iodoform in Intraocular Infections.—P. Römer (Würzburg). The observations of Ostwald and Haab have shown the good effects of iodoform in intraocular infections, and Römer presents the results he has obtained from this treatment in three cases.

The first was a purulent inflammation (not originating in the wound) which occurred four days after extraction for myopia, and was due to staphylococcus aureus. The anterior chamber was twice opened and iodoform-gelatine inserted, with the result that the eye was saved, and the patient discharged with vision $\frac{6}{36}$.

The second case was one of perforating wound with cataract and commencing panophthalmitis. After introduction of iodoform the pus in the anterior chamber subsided, and this eye was also saved, but with no useful vision. Here, too, staphylococci were present.

In the third case, which came on the fifth day after cataract extraction and which exhibited an unusual thread-like exudation on the surface of the iris, no good resulted from the iodoform, and the case ended in phthisis. This inflammation was caused by bacilli, whose species were not diagnosed, as all cultures failed.

The Relation of Tumours of the Optic Nerves to Elephantiasis Neuromatodes.—C. Emanuel (Leipzig). The occurrence of multiple tumours of nerves, and the anatomical similarity of the structure of optic nerve tumours to that of other nerves in their peri- or endo-neural origin, with the absence of correspondence between their histological structure and their malignancy, are all in favour of the author's views. They receive corroboration also from the observation of a family where the grandfather and father suffered from "fibroma molluscum," the whole body being covered with skin tumours, and the child of the latter died after excision of an optic nerve tumour.

In addition to the numerous exhibits in connection with the papers already noted, the following were shown :—

Thrombosis of Retinal Veins after Ligature of Common Carotid (picture of the fundus).—L. Bach.

Preparations and Pictures from a Case of Choroiditis Sympathetica, showing in the sympathising eye inflammatory foci along the choroidal and retinal vessels, decreasing in intensity from before backwards.—L. Bach. Bach assumes that small collections of lymphoid tissue produce here the same effect that is seen in the larger lymph glands in action of other toxines.

Tumours of Optic Nerve and Orbit.—Th. Leber. (1) Optic nerve tumour with calcified psammoma nodules. The tumour was removed by Swanzy (Dublin), with preservation of the eyeball. The tumour was found to be a myxosarcoma, in which the occurrence of the psammoma nodules is only a complication. (2) Optic nerve tumour recurring twenty-six years after an imperfect removal. The original tumour was a sarcoma, implicating the optic nerve, and leading to secondary glaucoma. The exenteration of the orbit was followed by purulent meningitis and sinus thrombosis. In the recurrent tumour psammoma nodules were present; the tumour was an endothelioma. (3) Preparations from a case of exophthalmos due to orbital tumour, which show that external pressure can by indenting all the tunics of the globe simulate a retinal detachment.

A New After Image and *An Operating Table.*—C. Hess.

Stereoscopic Photographs.—Uhthoff.

Instruments for Extraction of Lachrymal Sac, and for Kroenlein's Resection of Orbit.—Axenfeld. The first instrument is a speculum, which seems to be used in addition to Müller's, and which renders the field of operation less bloody. Axenfeld has performed this operation of extirpation of the sac more than 300 times, and is a firm believer in its utility in all cases of dacryocystitis and total stenosis of the duct. He operates under cocaine anæsthesia. Wagenmann operates in a somewhat different manner, but also without general anæsthesia, and seems to have done some 150 operations. Several others professed themselves strong adherents of the operation.

Leprous Disease of the Eye (microscopic slides).—Franke.

Stereoscopic Ophthalmometer for measuring the depth of the anterior chamber.—Hegg.

Endothelioma of the Orbit.—Krueckmann.

Electrical Ophthalmoscopic Lamp.—Mertens.

An Instrument for Tattooing Leucomata.—Nieden. This was similar in construction to a stylographic pen : he also exhibited a new material for tattooing, being the chorioidal pigment of the ox prepared by Merk. So far this has not proved superior to Indian ink.

Calcification of the Retina in Chronic Nephritis.—Römer.

Nerve Endings in the External Eye Muscles.—Levinsohn.

Slides of Bilateral Non-traumatic Perforation in the Macula Lutea.—Murakami. The specimens came from a case of old syphilitic chorioido-retinitis.

Dialysis Retinæ.—Wintersteiner. Separation of the retina from its attachment at the ora serrata.

Pocket Instrument Case and Steriliser.—Wicherkiewicz.

Microphotogram of the Mosaic of the Cones of the Human Fovea.—Heine.

FRENCH OPHTHALMOLOGICAL SOCIETY.

MAY, 1902.

The orbital and ocular complications of sinusitis.—M. de Lapersonne divides these into three classes : Abscesses and collections of fluid in the orbit ; lesions of the adnexa of the eye ; and alterations of the globe itself.

(1) Abscess formation in the orbit as a complication of acute sinusitis is met with—(*a*) In certain rather exceptional forms of frontal or ethmoidal empyema, the result of influenza, measles and erysipelas. (*b*) Abscess followed by fistula is the most common form in chronic empyema. It is preceded by phlegmon of the orbit, which may be more or less extensive, but is usually of comparatively slow development ; in this way it can generally be distinguished from metastatic cellulitis of the orbit. By and by

the pus seeks the surface, and discharges by a fistula which may practically never close up; if the empyema have been frontal in situation, the point of exit is apt to be at the upper inner angle of the orbit, if ethmoidal, at the inner side, either above or below the internal ligament. There may be (*c*) necrosis of part of the orbital wall along with the abscess formation. (*d*) The pus may remain encysted, and the sac in which it lies may even become ossified, so that the tumour may simulate an exostosis.

(2) The lesions of the adnexa resolve themselves into dacryocystitis and paralysis of the superior oblique muscle; the former is rare in frontal empyema; the latter may be temporary or permanent, in which case advancement of the inferior rectus is indicated (Landolt).

(3) A number of affections of the globe have been attributed to this condition with more or less probability, *e.g.*, herpes corneæ, iritis, choroido-retinitis, cataract, optic neuritis, thrombosis of the central vein, retrobulbar neuritis and atrophy.

Blindness and the Blind in France.—M. Trousseau presented an elaborate report, from which it appears that, omitting fractions,

Diseases of the optic nerve account for of the blindness,	21	per cent.
Glaucoma	19	,,
Diseases of iris and choroid ...	13	,,
,, conjunctiva	11	,,
,, cornea	8	,,
,, retina	6	,,
Congenital maladies	6	,,
Injuries	3	,,
General diseases	3	,,
Diseases of the globe	2	,,
Sympathetic ophthalmia	1	,,
Diseases of the lens	0·7	,,

For the diminution in the incidence of blindness, Trousseau indicated three means; these are: (1) Social: Better instruction of the public by means of pamphlets and circulars, encouraging attention to hygiene, teaching the rudiments of such matters in schools, avoiding overcrowding, improving the houses of the poorer classes and the lighting and airing of workrooms, and bettering the comforts and the morals of the poor. (2) Legislative: Compulsory notification of ophthalmia neonatorum, disinfection of the *locale* of endemic trachoma, enforcing and strengthening the regulations regarding the propagation of syphilis and contagious diseases, regarding alcoholism and the wearing of protectors by those engaged in dangerous occupations, and if possible by greater strictness in dealing with quacks, charlatans and prescribing chemists. (3) Medical: The more thorough instruction of the medical student in diseases of the eye would do much to prevent blindness. It is unfortunately still true that many a patient loses valuable opportunities of recovery, and many a curable malady is rendered incurable by the ignorance of the family medical attendant. He adds that in his opinion the title of ophthalmologist is too readily assumed by some whose claims to this distinction are very slender.

M. Truc, in a speech of some length, dealt principally with our duty towards those who have actually become blind. By some of the other speakers, the question of the most suitable routine treatment with the purpose of preventing infantile ophthalmia was discussed, and very varying opinions expressed.

Amblyopia of Hepatic Origin.— M. Jaqueau considered that among patients suffering from hepatic troubles, visual affections are apt to arise, functional at first but subsequently leading to definite changes in the fundus. These form themselves into two groups, according as they produce night-blindness, which is due to functional insufficiency of the hepatic cell, or amblyopia proper, with a central scotoma suggesting "alcoholic" blindness; this may be accompanied by paresis of the ciliary muscle, and may go on to complete amaurosis. The prognosis in all of these conditions depends entirely on the pathological condition of the liver. He imagines the origin of these symptoms to be thus caused: first, the inefficient destruction of organic toxines by the liver which are thus permitted to pass into the general circulation, and thus produce intoxication of the retinal cells. In the first degree this will produce simple torpor of these cells, causing them to cease acting unless the stimulus is great (night-blindness); in the second degree, coma of these cells, causing amblyopia with or without organic changes; in the third degree, complete coma and amaurosis, with definite organic changes.

Congenital Keratitis. — M. Terrien. It is still an unsettled problem whether those very rare congenital opacities of the cornea are of inflammatory origin, or are of the nature of an arrest in development. The general trend of opinion seems in favour of the former view, to which support is lent by the two cases examined by Terrien. The first was that of a child, born at full time, of a mother who had albuminuria, which presented in each cornea a central opacity without any redness or any malformation ; the child died in a week. Examination showed interstitial keratitis limited to the posterior layers ; the anterior epithelium, Bowman's membrane, and the anterior layers of the cornea proper were perfectly normal ; but Descemet's membrane had practically disappeared over a large area, and all the uveal tract was deeply congested and invaded by multitudes of small round cells, the iris more especially. Besides this, there were hæmorrhages in the internal layers of the retina and in the nerve sheath ; there were no indications whatever of congenital malformation. In the second case appearances were similar, but while the condition of the uveal tract was the same as in the former case, the invasion of the cornea, which is obviously an affection secondary to that of the vascular region, was much less accentuated.

Neuro-paralytic Keratitis in the Infant.—M. Terson related two instances of this condition, so very rare in childhood. One of these occurred in a tubercular child of four years, who had been attacked at two years of age. He had only succeeded in checking the condition by suturing the lids together from the puncta outwards, in such a way, however, as to leave the pupil available. His second case occurred in a little girl with congenital left-sided facial and orbicular paralysis, and insensibility of the cornea. The cornea on that side was completely destroyed, and, by and by, the other began to suffer from an alarming ulcer, it, too, being anæsthetic ; there was in fact the very rare spectacle of a bilateral neuro-paralytic keratitis.

Congenital Ophthalmoplegia.—M. Péchin observed a case of this nature in a man aged 20 ; the ophthalmoplegia proper was total, but the ptosis was not quite complete. Pupil reflexes and accommodation were quite active, and vision was normal on correction of 6D of myopia. The patient was able to gain his living as a carpenter, but having no power of moving the eye had much inconvenience at work. A diagnosis had not been made till he was 15, when his apprenticeship began, but there seemed no doubt that the condition had really been of congenital origin. The facial muscles were also to some extent implicated ; the occipito-frontalis could scarcely act at all. This involvement of the facial muscles did not, in Péchin's opinion, imply that there was a common origin for the ocular and facial motor nerves ; the different centres might readily enough be both injured by a common trophic influence.

Asthenopia "par clignement."—M. Bull described this condition, which he considers to be more frequent than is apt to be admitted

The patients have both troublesome vision and signs of irritation of the sensory nerves of the cornea ; they are apt to mislead one as to the true origin of the condition, by directing attention to the lids alone, in which the discomfort is felt, and which are often congested and irritable looking : they attribute all the annoyance to the state of lids, whereas the cornea is in reality partly at fault. As a preliminary and important measure in the treatment, the patients must give up the habit of blinking ; to assist them in this, proper lenses, or even smoked glasses, are useful. The patient must hold his book high and not look down to it, since when he does so the edge of the upper lid descends upon the tender area of the cornea ; but when the work is kept well up the lid rests upon a less abnormally sensitive part.

Irregularity of the Pupil.—M. Schramek is of opinion that more attention than is at present given to the matter should be devoted to the existence of minute irregularities of the pupil. He has been struck by the extreme frequency with which the pupillary orifice can be shown to be deformed in its outline in tabes, in syphilis and in general paralysis. At first unilateral, this irregularity comes later to affect both eyes, and often precedes by some time the development of the Argyll Robertson sign, of whose onset it may be regarded as the precursor. He appears to consider it as possessing the same definite indications as the better known sign. Care must be taken in observing it, not to be misled by the results of a previous iritis.

Hystero-Traumatism.—M. Dupuy-Dutemps related two very remarkable cases of this condition, of which the following brief notes may be given : A working man, aged 38, was struck in the face while at his work with a piece of cloth soaked in turpentine. Immediately afterwards he discovered the left eye to be quite blind, and the sight of the right one to be much impaired : its vision then rapidly disappeared also. Four years later, when the author saw him, there was absolute blindness of both eyes, but without the slightest ophthalmoscopic change, and without loss of the pupil reaction ; there was slight divergence and no converging power, no reflex winking on sudden approach of an object to the widely open eye. The sensibility of the cornea was intact, but there were patches of cutaneous anæsthesia ; there were no motor troubles and no other cerebral symptoms. The author had kept him under occasional observation for more than two years, and during all the six and a half years since the accident the condition had not varied.

A working man, aged 22, was charging a stove, when the flame rushed out upon his face; hemianopsia inferior and inability to guide himself were the immediate result. Three days after the accident there was no visible damage; the fundus was normal, so was the pupillary reaction, but there was no perception of light. The optic axes were slightly divergent, there was no convergence, no winking on sudden close presentation of an object. There was complete anæsthesia of the face on each side, but not of the cornea; general anæsthesia of the tongue and of the limbs; no other cerebral troubles. The condition had, up to date, remained unchanged for a year and a half. No diagnosis other than hystero traumatism seemed possible in these cases.

(*To be continued.*)

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

FRIDAY, JULY 4, 1902.

Mr. CHARLES HIGGINS in the Chair.

CARD SPECIMENS.

Metastatic Carcinoma of the Choroid.—Mr. J. H. Parsons showed microscopical specimens. The metastasis originated in previous scirrhus of the breast. The specimens showed clearly the progress of the growth along the lymphatic channels, parallel with the vessels, and spreading laterally without there being any tendency to heaping up of the growth, this most probably being the reason for carcinomata of the choroid taking the form of flat growths in contrast to the heaped up mass of sarcomata.

Annular Leuco-Sarcoma of the Ciliary Body.—Mr. J. H. Parsons showed microscopical specimens, cut from the left eye of a boy aged 14; the eye had been injured by a kick some seven years previously, and had been blind ever since. Almost the entire extent of the ciliary body was changed into a mass of small round sarcomatous cells.

(The full details of both these cases are given in the last issue of the R.L.O.H. Reports).

Gumma of the Ciliary Body.—Mr. A. Stanford Morton and Mr. J. H. Parsons. The patient, a woman, aged 73, was admitted into Moorfields Hospital on April 22, 1902. The right eye had been much inflamed for a month, the left for a fortnight.

In the *right* eye below the cornea was an ulcer containing white slough, the edges of the ulcer being raised and widely surrounded by an inflamed area. The cornea itself remained clear except in the lower part, where there was a vertical fold of Descemet's membrane. The anterior chamber showed a small hypopyon. The iris was bright and clear, but several posterior synechiæ were present, and there were some opacities in the lens, chiefly at the periphery. The tension of the eyeball was minus.

In the *left* eye the cornea was clear, but there was exudation into the anterior chamber at the lower part. There were some posterior synechiæ and opacities in the lens, and the tension of the eyeball was normal.

On April 24 the patient appeared very feeble with intermittent pulse.

On April 25 at 6 a.m. her temperature was 102·2. There had been no rigors; her pulse was regular but easily compressed. Dulness over the upper part of the left chest was noticed, and her feet became œdematous. Death occurred at 3.16 p.m.

The right eyeball was removed, hardened in formol, frozen and cut. On examination the cornea was clear and wrinkled vertically, somewhat infiltrated below at the edge of the ulcer which encroached upon it; the anterior chamber full of albuminous coagulum, the ulcer was found to communicate with it directly, at the lower part. The iris was inflamed and the pupil small. The ciliary body was found detached from the sclera throughout its circumference, the sub-ciliary space being filled with a brownish coagulum. Below, the ulcer was seen to form the surface of a round white mass which involved the sclerotic and ciliary body The lens appeared normal, the vitreous turbid, with flocculent masses of pus in the lower part. The retina, which remained in its normal position, was white and œdematous. The choroid itself was much swollen, as also the optic disc. The sclera was slightly distorted, having a transverse groove at the equator below.

Microscopically.—Bowman's membrane was found intact excepting at the very periphery. The substantia propria was œdematous; Schlemm's canal was surrounded by small round cells and contained blood. The filtration angle at the lower part was full of fibrinous clot and leucocytes, which were in direct connection with the gumma where it had broken into the anterior chamber at the corneo-sclerotic junction. The ciliary body was intensely inflamed and the ciliary processes covered with leucocytes, while the pigment epithelium at the tips of the processes had become bleached. Below, the ciliary body was largely replaced by gummatous infiltration. The sclerotic was absorbed directly behind the gumma, which externally opened into the conjunctiva as a sloughing ulcer, the conjunctiva round the ulcer forming a swollen fold, the epithelium of which had grown in along the under surface for some distance. The gumma itself, which was entirely necrotic, consisted of round cells and necrosed cells of the sclerotic, but no giant cells were present. The cornea immediately surrounding it was much thickened owing to round-celled infiltration between the corneal lamellæ widely separating them. Where the gumma invaded the anterior chamber the limbus had entirely disappeared.

In this case there was no *definite* history of syphilis. It was thought that the inflammation most probably commenced in the ciliary body and spread outwards till it broke through the conjunctiva, and then broke down into an ulcer.

In most of the reported cases giant-cells appear to have been absent, as pointed out by Baumgarten, who states, "in pure gummata, giant-cells, especially of the Langhans type, may be entirely absent;" he also regards their presence as an indication of mixed infection of tubercle and syphilis. Hanke of Vienna records a similar case to the above. Thirteen other cases were referred to, notably those by Hippel, Delafield, Loring, Alt, Scherl, Baas, Baumgarten, &c.

Rupture of the Eyeball with Prolapse of the Iris without Dislocation of the Lens or much Disturbance of Vision.—Mr. R. W. Doyne. The patient, a woman, had been struck in the left eye by a fist. The pupil was drawn to the inner side, and there was a large dark swelling under the conjunctiva, apparently where the sclerotic had ruptured and the iris prolapsed. The vision was remarkable, L. $\frac{6}{9}$ partly. Some doubt appeared to exist as to the treatment to be adopted, the rupture being within the dangerous area, no doubt, but no punctured wound being present.

PAPERS :—

A Case of Detachment of the Retina, in which Complete Recovery took place.—Mr. Charles Higgins. The patient, a woman aged 27, was first seen in 1892, having a high degree of myopia with posterior staphylomata in both eyes. Vision : R. $\frac{6}{18}$ with sph. —12 ⊂⊃ cyl. —2·25 horizontal ; L. $\frac{6}{18}$ with sph. —13 ⊂⊃ cyl. —2·25 horizontal.

In 1894, the vision and condition of the eyes remained the same.

In August, 1899, sudden dimness of the left eye was noticed, the upper part of the field being lost owing to a large detachment of the lower half of the retina. The treatment at this time adopted consisted of rest in the horizontal position, with massage with the oleate of mercury (10 per cent.) into the temple and forehead. In August some improvement in vision, and much improvement in the upper part of the field. In December, 1899, the field was full and she read J. 14 at 4 inches.

On May 1, obscuration of the upper part of the field of the right eye was noticed, due to a detachment of the retina at the periphery below and to the inner side. The same treatment was again resorted to, rest in horizontal position and inunction, to which were added vapour baths, but as after these the patient complained of being almost blind, they were discontinued. From this time onwards. she was in the habit of lying down for a few hours every afternoon, till June 25, and the sight remained the same on that particular day; after having gone to sleep while lying down in the afternoon, she woke up to find her sight was as good as it had ever been before the detachment took place, and the "bladder," as she called it, which obscured her sight in the upper part of the field had disappeared. With the ophthalmoscope, no signs of any detachment could be made out, nor were there any signs of detachment ever having been present. In January, 1902, vision: R. $\frac{6}{24}$ with sph. —10 ○ cyl. —2·25 horizontal, and J. 1, at 8 inches with sph. —6 and the same cylinder; and at this time no sign of any detachment existed.

Mr. Higgins in remarking on this case stated that he considered no advancement had been made in the treatment of detachment of the retina, and that in this case, which is truly one of complete recovery, the recovery is most probably quite accidental and not due to the treatment.

A Case of Retinal Detachment after Cataract Extraction.—Mr. Ernest H. Cartwright. The patient, aged 73, was first seen in April, 1900. On the right eye an extraction without iridectomy had been performed in February, 1899, and subsequently two capsulotomies, the last in November, 1899. Vision: R., with sph. + 11 ○ cyl. + 1 horizontal, $\frac{6}{8}$ and with + 15 ○ cyl. + 1 horizontal J. 1. When seen again on January 7th, 1901, patient gave the history that his sight in the right eye had suddenly failed during one day; he stated that everything looked red and the sight became lost for everything below the horizontal. R.E., vision = finger counting at 6 inches and in the upper part of the field only. In the left eye there was an almost mature cataract, with good projection of light.

On examining the right fundus with the ophthalmoscope, the upper half of the retina was seen to be detached and hanging down, obscuring the view of the disc. His cardiac and renal systems were normal; it was not known whether any vitreous had been lost at the time of the operation, which might account for the detachment. The patient was kept in bed, and on January 9 a scleral puncture was made with a Graefe's knife as far back as possible to the outer side of the superior rectus, when some clear watery fluid escaped. On January 22 the disc had become visible, but the vision was no better. The patient was discharged on January 25, *in statu quo*. On September 18, 1901, the vision of the right eye was $\frac{6}{18}$ with the glasses before mentioned, and J. 2, but with difficulty. The field had become nearly normal except on the temporal side.

On September 27, 1901, patient was again admitted and an extraction performed on the left eye. On November 29, the right eye had with glasses $\frac{6}{12}$ and J. 1, easily. The left eye had with sph. + 10 $\frown$ cyl. + 3 axis 165°, $\frac{6}{6}$; with + 14 and the same cylinder, J. 1. The field of vision of the right eye was contracted in the upper part, by reason of a very prominent orbital margin. With the ophthalmoscope no sign of detachment or even of previous detachment could be made out.

Mr. Cartwright considered any treatment in such cases of detachment to be of but little avail, recovery taking place equally well with or without it, if the detachment is going to disappear; if not no treatment is of much use.

In the discussion which followed the reading of these two papers, Mr. Higgins said it was not a very uncommon thing for the result of cataract operations to be impaired or completely spoiled by the occurrence of detachment of the retina, but such cases might not turn out to be always as hopeless as they at first appeared, but at the same time he thought that treatment of any kind was of very little benefit.

Mr. Hartridge could not count one among a large number of cases of detachment of the retina in which recovery took place. He considered the only cases in which recovery could be expected were those in which the detachment was the result of a blow, with subsequent hæmorrhage between the retina and the choroid; or was due to some inflammatory exudation, either of which could readily become absorbed, with re-attachment of the retina. In most of the other varieties of detached retina he considered there was a diseased condition of the vitreous. He enquired whether in Mr. Cartwright's case there was any escape of vitreous at the time of the operation, which he considered to be the most usual cause of detachment of the retina after cataract extraction, otherwise he considered it an uncommon complication of cataract extraction.

Mr. D. Marshall was of opinion that the really important question was how long these cases would remain cured without the detachment recurring. He mentioned one case in which recovery appeared to have taken place after some weeks rest in bed, and in which vision returned with a full field; but some few years afterwards the detachment again recurred and this time remained as a detachment, with the result that the eye became quite blind. He also mentioned another case in which there was detachment of retina following a blow on the eyeball, and after some time spent in bed it became re-attached and remained so for several months, but Mr. Marshall questioned the probability of its remaining cured for any great length of time.

Mr. Jessop expressed the opinion that the complete and permanent recovery of detached retina was almost unknown; cases had apparently recovered for a time, but in all the detachment had reappeared after a greater or less interval. He quite agreed with the opinion already expressed that treatment is of very little use, and that the one method of treatment chiefly to be avoided was the operative method by scleral puncture.

Convergent Strabismus treated by Lengthening the Internal Rectus Tendon.—Mr. Sydney Stephenson. This operation aims at lengthening, and not shifting, the attachment of the tendon to be operated upon.

Technique of the Operation.—A vertical or curvilinear incision is made through the conjunctiva over the insertion of the internal rectus, which is then exposed as fully as possible. A small strabismus hook is then passed beneath the tendon, and a suture of fine china twist inserted through the lower border close to the sclera: (1) A long obliquely-directed incision is next made with scissors, commencing at the lower border of the scleral insertion and terminating at the upper border of the muscle some distance behind its tendinous attachment to the eyeball. Or by another method: (2) the lower half of the tendon is cut through some little distance from the scleral insertion, and an incision carried along the centre of the tendon midway between its upper and lower borders. This incision finally terminates at right angles to its former course. The lengthening of the tendon should be directly proportionate to the linear measurement of the squint. The suture mentioned is employed to unite the end of the lower strip of muscle to the end of the upper strip.

Mr. Stephenson usually performs the operation under cocaine

(2 per cent.) in adrenalin chloride ; this he finds prevents oozing of blood, which is so apt to obscure everything. So far he has done the operation on six cases, all of which have been successful, except one. He considers it a more exact and scientific operation than the ordinary tenotomy. In the discussion which followed, Mr. Charles Higgins said he thought the great difficulty in all operations for squint was that there could not be anything like mathematical precision in the operation, but he considered Mr. Stephenson's method held out some prospect of greater exactness and precision.

The Annual General Meeting of the Society was then held, election of officers, &c., for next session. Mr. David Little was again elected President.

Reported by Mr. REGINALD E. BICKERTON.

CLINICAL NOTES.

PICRIC ACID IN BLEPHARITIS.—Fage (Amiens) speaks very highly of the merits of picric acid in the treatment of chronic blepharitis, contrasting it very favourably with most of the other popular medicaments which, when useful, are almost always painful. Picric acid is painless in itself, indeed, its analgesic action marks it out as valuable in many conditions, in burns for example, and in eczema, where the pain and itching are greatly mitigated by its use. It is also antiseptic in its action ; possibly it is largely on account of this quality that it is so valuable as an application. Lastly, it has a very decided power of encouraging the growth of epithelium. And if it does leave a yellow stain, this is but temporary, and at least no worse than that caused by many another application. A watery solution of ·8 to 1 per cent. forms a good application which may be painted on again and again, any crusts should first of all be picked off.—*La Clinique Ophtalmologique*, June 25, 1901.

OPERATIONS FOR CONGENITAL BLINDNESS.—It happens but very rarely in this country that patients are operated upon only in adult life for a condition causing congenital blindness, but in the remoter parts of Russia and other countries such a circumstance does occasionally occur. Königsberg, of Orenburg, records three such from his own practice, and gives very curious details of the experiences of the patients in "learning to see." The first was a lad aged 18, who had all his life only possessed light-perception, but as the cataract to which this was due appeared to be uncomplicated, extraction was performed in one eye with good result. When able to look about him he was shown various objects, such as an apple, a tumbler, a loaf of bread, a chair, matches, &c., and he was asked if he could tell what they were. Not one could he distinguish by sight alone; he had to touch each, and then knew at once. The question which has interested physiologists for many a day, whether one *originally* interprets the attitude of an object as displayed retinally or as corrected psychically, inverted, or as it actually is, of course attracted Königsberg's attention, and in this patient he tested the point thus. As the lad could readily distinguish (after brief instruction) between red and green, papers of these two colours were held before him, one above the other, and he was asked which stood the higher: he never hesitated, but was correct invariably. He was asked to touch a selected one, and at once placed his finger on the correct spot. This was accomplished without difficulty, whether he was or was not wearing the necessary convex lenses. Prolonged observation is thus obviously not required (as one theory postulates) to teach one to interpret correctly the retinal inversion of the picture: one interprets psychically correctly without any "education." The patient had, however, as is to be expected, great difficulty with the estimation of space and distance; if prohibited from using his hands he bumped against objects or gave them a ridiculously wide berth; the distrust and diffidence with which he undertook the passage through even a familiar doorway formed an interesting and somewhat amusing sight.

In the cases of the second and third patients, a man aged 28 and a girl of 16, precisely the same points were noted--the absolute and immediate correctness of their estimation of the position of objects in their true vertical relations, their inability to recognise any object at first by sight alone, and their extreme uncertainty as to the proximity or distance of surrounding objects. In regard to the man, Königsberg relates the following amusing circumstance:—" In July I allowed him to leave his room and take a walk, accompanied by an attendant, in the garden by moonlight. On passing through one of the alleys he kept jumping every now and then as though desirous of getting over something that lay in his way. The puzzled attendant asked him what it all meant, and was informed that the numerous objects lying across the road made the frequently recurring leaps necessary. Guessing what these impediments were, the attendant explained to Barsukoff that it was not matter, but shadows—the shadows of the trees and their branches that lay across his path; the latter, however, unable to grasp the idea of a shadow, would not accept so flimsy an explanation without putting it to the test, and continued his jumps till tired out. He at last, with the help of touch, satisfied himself that there was no physical obstruction on the road."—*Scottish Medical and Surgical Journal* (Translation from the Russian), June, 1902.

OPHTHALMIA A NOTIFIABLE DISEASE.—" The Board of Health [of New York] has declared ophthalmia, both acute and chronic, to be a contagious disease. Under this decision physicians will be required to report promptly to the Department of Health all cases of the disease that they may find. The Board of Education will also be asked to lend its aid towards stamping the disease out of the public schools, where it is now prevalent."—*Medical Record*, New York, June 14, 1902.

ZONULAR CATARACT.[1]

By J. B. Story.

The cataract exhibited was removed from the eye of a man aged 40 by a simple extraction without iridectomy. A similar cataract had been removed from the other eye a few weeks earlier, but the lens was too much injured in the extraction to admit of satisfactory sections of the cataract. The sections of the present case kindly made by Dr. Earl show perfectly the changes in the lens, which have been described by other observers, viz., Lawford and Schirmer, and though they do not add anything to our knowledge of zonular cataract that has not been published, I think the case is worth record as corroborating what has been observed by others.

This peculiar affection of the crystalline lens has long been known to ophthalmic surgeons, but the first exact anatomical description of it was made by E. v. Jaeger in 1854. We learn from an observation made by Hulke in the *Transactions of the Opthalmological Society* in 1890, that Bowman demonstrated the lesion in a cat in 1846, but this demonstration was never published. v. Graefe described the affection in 1855, and from that time till very recently no important addition was made to our knowledge of the anatomical condition of the lens in zonular cataract, although a great many interesting observations were made upon

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[1] Read at Pathological Section of the Royal Academy of Medicine in Ireland.

Ophth. Review. Vol. XXI., No. 251, September, 1902

the clinical history, and several ingenious theories have been advanced to account for its causation. The affection may be described as a partial opacity of the lens implicating only a zone, or rather sphere of fibres lying between the centre and the periphery, so that the cortex is transparent, and also the nucleus, but the latter is separated all round from the clear cortex by a spherical layer of opacity. The volume of the lens is less than that of the normal lens of the same age. The condition is nearly always bilateral, and often congenital, though it has been known to form after birth, and there may be several separate zones of opacity, so that the lens is a sort of sandwich of transparent and semi-opaque layers from periphery to centre.

The above sums up all that was known on the subject till Arlt made the observation that the subjects of this form of cataract very frequently suffered from convulsions in infancy, and he put forward the theory that in the convulsions some lesion was produced at the junction of the harder central portion with the softer peripheral portion of the lens. This connection with convulsions was confirmed by Horner of Zürich, who observed also that the children affected exhibited many signs of rickets, in their teeth, skulls, and skeletons, and were often of imperfect mental development in addition. The marks of the teeth described by Horner are exactly the same as those attributed by Jonathan Hutchinson to the action of mercury in infancy. The sequence would then be convulsions, calomel, stomatitis, and deformed teeth.

After Horner's observations the theory advanced by Arlt was generally abandoned, and the views of Horner accepted, which may be stated as follows. A temporary derangement of nutrition affecting the whole organism, generally of the nature of rickets, produces defects in the young growing fibres of the lens without affecting the older central fibres, and as new transparent fibres are formed subsequently external to the opaque zone, the result is a zonular cataract. The peculiar dental defects are accounted for by the similarity of the development of the enamel organ to that of the crystalline lens.

From the time of Horner's publication till a very short time ago it was generally accepted that the nucleus of the lens is normal in zonular cataract, but Beselin discovered that this is not the case, and that the nucleus exhibits numerous minute vacuoles which he regarded as post-mortem changes. Between the nucleus and the periphery he found a cleft filled with granular material, and this he considered to be the actual cataract seen *intra vitam.* He attributed the cataract to a shrinking of the nucleus which caused a separation between it and the cortex. The novel point in Beselin's description is the implication of the nucleus, and this has been corroborated by nearly, if not quite, all the subsequent observers, including myself; but it has been shown conclusively by Schirmer that the cleft observed is not the cataractous zone, which is itself also formed by vacuoles. My case entirely agrees with those of Schirmer, and I think a study of the photographs of Lawford's case will convince anyone that the opacity in his case, too, is formed by a layer of vacuoles at the outer border of the nucleus.

It may be admitted as a generally accepted fact that there are pathological changes in the whole lens substance interior to the zone of cataract, and that this opacity is caused by a dense agglomeration of the same vacuoles which are found more sparsely in the apparently clear nucleus. The most satisfactory explanation of this anatomical condition is, I think, that of Schirmer, which is in essentials the old theory of Horner adapted to our present knowledge. It may be stated thus:

Some temporary lesion of nutrition affects the entire crystalline lens and produces vacuoles among the fibres, but these changes are only sufficiently marked in the youngest fibres to produce a definite clinical opacity, and this is the zonular cataract. If the whole lens nucleus and cortex happens to be pretty nearly equally affected we have a stationary central cataract, which may be looked upon as a sort of imperfect zonular cataract. The shrinking of the nucleus produces clefts which appear as the well-known "outriders" seen in these cataracts, and to the same cause is due the diminished size of the lens in these cases.

There are certain difficulties, however, in this theory, which have not yet been cleared up. One is that it assumes that every zonular cataract must begin as a total cataract, though a cataract of but slight saturation. Now no observer has described the change of an infantile total cataract into a zonular cataract by addition of clear lens fibres to its outside, and if it was really a common occurrence some one should have seen it. Again, the measurements made by Dub are not easily reconciled with this theory. In ten cases of bilateral and quite symmetrical zonular cataracts between the ages of 8 and 24 he found the diameter of the cataracts varied from 4·4 to 5·6 mm.

The average diameter of the lens (equatorial) he found to be 7·46 mm. in children under one year, and 7·87 mm. in children under two years. Treacher Collins found the lens of the seven months fœtus to have a diameter of 5 mm., and that of the nine months fœtus a diameter of 5·75 mm. This makes it very difficult to believe that zonular cataract, if it implicates the whole lens existing at the time, can arise in the first or second year of life, when the convulsions, rickets, &c., present themselves, for the diameter of the lens is then already greater than that of the zonular cataracts measured by Dub. The commencement of the disease must be put back pretty far into intrauterine life, or we must admit that it is a lesion that only affects a portion, and not the whole of the lens. Or possibly there may be in these lenses a completely abnormal rapidity of the nuclear shrinking that is going on constantly in all lenses.

REVIEWS.

SALOMONSOHN (Berlin). Unilateral Ophthalmoplegia Exterior. *v. Graefe's Archiv für Ophthalmologie, liv.*, 2.

The situation of the lesion in a case of bilateral ophthalmoplegia exterior (or externa) is simple enough, but the localisation of a lesion which can produce the same condition on one side only is not at all a simple matter. The case of the fourth nerve causes the difficulty, for how is it possible for the exterior muscles of one eye to become paralysed by one lesion if the nerve centres for some of the muscles are on one side, and for others are crossed? Lichtheim seeks to get round the difficulty by saying that the centres on the two sides (of the third nerve on one side, of the fourth on the other) are functionally united, and are therefore predisposed to suffer at the same time. But surely if this argument were sound it might apply in other ways, in circumstances in which it manifestly does not hold good; thus one might say, as Mauthner long ago pointed out, that there are few closer connections than the internal rectus and the ciliary muscle, yet by postulate the internal rectus is not affected in cases of ophthalmoplegia interior, nor the ciliary muscle in those of ophthalmoplegia exterior. Mauthner, indeed, simplifies the matter and disposes of the obstacle briefly by denying flatly the crossing of the trochlear fibres. If this is the truth, then the affected nuclei would all be on one side; as yet, however, no *post-mortem* examination has ever been made on a case of unilateral ophthalmoplegia, and indeed the number of cases observed during life has, as yet, been very small, and the prognosis seems to be on the whole distinctly favourable.

As regards the bilateral form, it has been shown that the situation of the lesion is not infallibly nuclear, and in the case of the unilateral manifestation, Marina has pointed out that a nuclear situation is, in point of fact, far from probable.

After a short preliminary sketch of the subject, of which we have thus indicated the outlines, Salomonsohn proceeds to give an account of a case which came under his own observation. It was that of a healthy man, aged 32, who admitted having had gonorrhœa, but never syphilis ; in the summer of 1901 he had occasion to make a railway journey one day, and seated himself with his right side next an open window, although he had entered the train in an extremely heated condition and perspiring copiously. Next morning there was much pain in the right side of the face, he complained of diplopia, and was told at the hospital at which he applied for treatment that there was paralysis of an eye-muscle. This seems to have resisted treatment with iodide and inunction, and in October he was under treatment in Berlin. At that time he had headaches located in the right temple, with almost (not absolutely) complete ptosis. On raising the lid with the finger, the eye was seen standing in mid position, incapable of moving from that spot, but becoming markedly rotated (the upper part of the cornea inwards) by the superior oblique on any attempt to look downwards. The pupil was very small and angular, showing the Argyll-Robertson sign. The pupil of the left eye was much larger, perfectly circular, and reacted normally. In each eye there was high hypermetropia, but perfect vision on correction ; the range of accommodation was in each eye equal to the normal average for the age of the patient. Atropin and cocaine dilated the right pupil very slowly, though the ciliary muscle was at once paralysed. On both sides colour vision, fields, and the fundus were normal. Sensation was completely lost over the first and second branches of the fifth nerve, and the cornea was anæsthetic and dull, but pressure over the anæsthetic area of skin, and pin-pricking more especially, were felt more acutely on the right side. The patellar reflex was absent. For a time it appeared as though the cornea would be destroyed by neuro-paralytic keratitis, but gradually matters improved again, the ulcer cleared up, and the immobility of the eye even became better, though the external rectus remained paralysed. The inferior maxillary division of the fifth nerve became paralysed also, and the hypoglossal at a later time, but taste was not affected. The pterygoid muscles continued to act well, though the masseter and temporal lost function.

Apparently, then, in this case there must have been an extensive unilateral affection of the cranial nerves; in addition, pointing to the central nervous system as the site of the mischief, there was loss of the patellar and cremasteric reflexes. The affection began after exposure to draught, and the initial symptoms were paralysis (probably) of the right external rectus, and pain in the region of the fifth nerve, most probably accompanied by anæsthesia. Three months later there was a complete paralysis of all the motor apparatus of the globe; a real unilateral ophthalmoplegia exterior. At the same time employment of a mydriatic showed that the dilator pupillæ was not paralysed. This fact indicated that the situation of the lesion causing the myosis was "above" the superior cervical ganglion; at the same time the activity of the pupil contraction with accommodation proved the functional activity of the sphincter pupillæ. Accommodation, too, was intact, so that there was no ophthalmoplegia interior. A month later a new stage was reached when the hypoglossal and the third division (incompletely) of the fifth nerve were attacked, and the cornea began to suffer and the pupil dilator muscle was paralysed. Among other interesting features unilateral lachrymation and perspiration were also noted.

In considering the question of the precise locality of the lesion productive of all these various symptoms one may leave out of account the cortex and subcortical fibres, for cortical centres for unilateral eye movements have not been demonstrated and probably do not exist; there follows then, in the first place, the possibility of a *nuclear* situation. Supposing Mauthner's view, that the fibres of the fourth nucleus do not cross, be true, then a right-sided lesion has spread right along the floor of the aqueduct of Sylvius, taking its origin in the nucleus of the sixth nerve, then catching part of the sensory region of the fifth nerve, the fourth and the whole of the third except the pupil and accommodation nuclei, then involving the motor portion of the fifth and the rest of the sensory part which had up to that time been spared, and implicating next the hypoglossal. The mere fact that certain of the centres were spared which lie among those which were affected is not sufficient to invalidate this theory. In the occurrence of myosis along with loss of light reaction, Mauthner would most probably have found an additional argument in favour of the nuclear situation of the lesion, for he held strongly the opinion that "paralysis of the third nerve with concurrent contraction of the pupil can only be explained by a nuclear lesion," on the ground that "only at one place, where the interior branches and the exterior lie separate, can one source of evil paralyse the one set and excite the other."

But is the lesion intracerebral at all? Because, if it attacks a portion of the nucleus one would expect that if it progressed it would also paralyse, and not continue to excite, the neighbouring nuclei, or that the original paralysis at least should show some signs of remission. And if myosis neither passes into mydriasis nor passes away, one may be fairly certain that it is itself paralytic in nature. Nor is the myosis in this case to be regarded as necessarily decisive of the site of the lesion, for there are at least two possibilities on the other side. In the first place, the myosis might be due to a previously existing complication which had no direct reference to the particular cause of the ophthalmoplegia, and whose situation might happen to be somewhere in the line of the pupil-dilating fibres, above the superior cervical ganglion or above the sphincter nucleus; or, on the other hand, it might have arisen from some direct pathological condition totally unconnected with the cerebrum. This possibility was, indeed, under discussion when the patient developed the paralysis of the dilator, by which, if he had not previously had myosis, he would then have acquired it, and which caused total loss of all pupillary reaction. It is not in every case that the past history of the patient's condition and the stage at which the examination is made combine to afford evidence so precise. But if we put aside for the moment the fact of the myosis and its influence on one's theory of the situation, a nuclear lesion seems, in point of fact, impossible; for the researches of recent date have shown that there can be little doubt of the crossing of the trochlear fibres, and even of part of those pertaining to the third nucleus. There seems now to be no room for doubt that such is the case, and if it be so then a nuclear affection on one side would manifest itself by implication of both eyes. But by observation, this is not the case in the patient under consideration; therefore, while Mauthner, who held the view that such a lesion must be nuclear, concluded from this that anatomists must be wrong about the crossing of the fibres, Salomonsohn, relying upon the accuracy of anatomists and experimenters, says the lesion cannot be nuclear.

In the present case two circumstances seemed to point definitely to the impossibility of a nuclear lesion; the first of these was the occurrence of paralysis of the dilator pupillæ. The fibres thus implicated take their origin in the cervical ganglia, and pass to the Gasserian ganglion, and so by the fifth nerve to the ciliary ganglion and the muscle. Somewhere along this route, then, the fibres must have been "caught," and since the symptom appeared for the first time a little later than the paralysis of the fifth, it seems almost certain to have been due to a descending degeneration from neuritis The second fact is the occurrence of neuro-paralytic keratitis as a complication. All good observers agree that this symptom is produced by a lesion of the fifth nerve below the pons.

Since a subcortical lesion is out of the question, can the lesion be *basal?* If so, how comes it that some of the fibres, and those closely connected functionally, are spared, while the rest are completely *hors de combat?* Hock, indeed, states that the pupil and accommodation fibres lie in the very centre of the nerve at the base of the skull, so that it is not impossible for them to be spared; but Mauthner cannot accept this as an explanation. "It is inconceivable," he says, "that the outside fibres should be rendered completely functionless while the interior bundle continues uninjured." But apparently from the work of Uhthoff, Ferrier and others, this can actually take place, whether from greater resisting power of certain fibres, as some have supposed, or not. The curious point is that the bundle spared in certain cases has been in others the bundle destroyed; there is not uniformity of resisting power (if that be the explanation) in different individuals. A more vital point in this relation is that the number of nerve fibres is normally much in excess of the minimum required for the innervation of the muscle, and paresis or paralysis only occurs when the number of intact fibres falls below this minimum. Thus, to take an example, it may often be observed in a case of optic atrophy, that though the wasting process is far advanced, the light reaction of the pupil is quite active; and similarly it may quite well be that the integrity of even a very few of the pupil fibres may be sufficient to maintain the myosis. It is much to be regretted that in a good number of such cases the observer is content with a very perfunctory examination of the range of accommodation. Basal paralysis of the third nerve is a much more probable diagnosis in cases in which the whole of the muscles are partially affected, or affected to different degrees, along with perfect pupillary action, and more or less complete loss of accommodation, than when all the exterior muscles are entirely paralysed and the interior perfectly unaffected, though even in such a case it would be wrong to consider a basal lesion altogether impossible. The complete integrity of an isolated bundle in a nerve otherwise entirely paralysed is more contradictory of a basal lesion than is an isolated paralysis (ptosis, for example) in a nerve otherwise intact.

In the case under review, a fact which strongly indicated a basal situation was the involvement of the fifth nerve. If the seat of lesion was in the anterior portion of the middle fossa, where the sympathetic fibres join the first division of the fifth to become the innervating influence of the dilator, the involvement of this muscle is explained; so also is the neuro-paralytic keratitis, as well as the absence of tears on the paralysed side, for it is probable that though the actual secretory fibres of the lachrymal gland run in the facial nerve, they come from the fifth indirectly. But there are some points unexplained if the lesion was in the middle fossa, notably the implication of the hypoglossal nerve. The suggestion that the pathological process in the middle fossa might have sent a "process" backwards and caught the hypoglossal is not probable, since other nerves also lie so close that they could hardly have escaped; and besides, meningitis in the posterior fossa is much less apt to be unilateral than when further forwards, for the anatomical relations of parts do not so markedly separate the two sides. A tumour of the base, extensive enough to reach the two areas, must surely have produced cerebral symptoms, so that any idea of the existence of a neoplasm may be dismissed. In addition there were the important facts that taste was unaffected, and that the pterygoid muscle acted normally, though the masseter and the temporal were paralysed. Salomonsohn concluded, therefore, that the lesion could not be basal.

In favour of a *peripheral* situation there must be reckoned the mode of onset, definitely after an exposure to cold, the paræsthesia and pain at the first occurrence. The fact also that rise of temperature and tapping or pressure increased the pain, seems strongly to indicate a neuritic rather than a meningitic origin of this symptom. And further, the fact that there were no head symptoms and the state of the electrical reactions in the muscles of the aw are both in favour of a peripheral cause.

The conclusion to be drawn from this article—one of great interest and full of clear reasoning—then is, that unilateral ophthalmoplegia is not in every case nuclear in its origin, if indeed it ever is so; and also that in this particular instance the lesion was not even basal but peripheral.

W. G. S.

TAYLOR and COLLIER (London). The Occurrence of Optic Neuritis in Lesions of the Spinal Cord. Injury, Tumour, Myelitis. *Brain*, No. 96, Winter, 1901.

This interesting paper is based on a series of twelve cases, in one of which an autopsy was made, under the observation of the writers. In addition to the reports of their cases, the authors give a list of all the recorded cases they were able to find in the literature of the subject, and an analysis of all the cases of local lesions of the spinal cord which have been under treatment at the National Hospital for the Paralysed and Epileptic during the years 1892-1900, with reference to the state of the optic discs.

The authors give detailed notes of their twelve cases: in this review merely the substance of the writers' remarks will be given. The cases included eight males and four females, and the ages ranged from 14 to 56. It seems somewhat remarkable that in only one of a dozen instances of serious diseases of the spinal cord was an autopsy obtained. In the other cases the disease had not proved fatal at the time the paper was written.

The comments of the writers on their cases are briefly as follows: The most striking feature is that, notwithstanding the varied nature of the lesions, myelitis, compression, injury and probably hæmorrhage, the situation in all was cervical, or the upper dorsal region of the cord. An analysis of recorded cases shows a similar result, and further, if only those cases which have been verified *post mortem* be taken, the lesions are found to have been confined to even narrower limits in the downward direction.

It is difficult to explain the origin of the statement found in several recent text-books of medicine that optic neuritis in spinal cord disease occurs in association with disseminated myelitis, and that in a large proportion of cases the myelitis is limited to the dorso-lumbar region. Neither among published cases nor among the records of the National Hospital for the past ten years have the writers found a case of spinal cord lesion associated with optic neuritis, in which the cervical enlargement of the cord was uninvolved. They suggest, therefore, that the occurrence of optic neuritis in these cases is dependent in part upon the situation of the lesion in the cord.

The nature of the lesion in the cases now recorded varies, the larger proportion being examples of transverse myelitis; this is true also of the previously published cases.

In some of the recorded cases of myelitis associated with optic neuritis the disease has been narrowly limited, in others it has been of very wide extent. In one instance reported by Schluster and Mendel, the spinal cord was practically destroyed from the lower cervical to the sacral region.

In about two-thirds of the cases of myelitis a history of syphilis has been obtained, and in relation with this fact it is noticeable that the incidence of the disease is chiefly in the third and fourth decades of life.

The authors suggest that the association of optic neuritis with a lesion of the spinal cord depends upon (1) the position of the lesion; (2) some peculiarity in the nature of the disturbance of the functions of the spinal cord produced by the lesions, for in the recorded cases the damage to the cervical enlargement, although sometimes extensive, has been partial only.

In the present series of cases, as well as in those previously recorded, the neuritis has not generally been severe. Increasing for a few weeks after its appearance, it usually begins to subside within two months of the onset, sometimes disappearing so completely as to leave scarcely a trace ; it is not usually followed by an incapacitating degree of atrophy and loss of sight. In several recorded cases, as in two of the present series, optic neuritis preceded the paraplegia by some days or weeks.

In not a few cases, however, the neuritis has been very intense, and has resulted in complete and permanent blindness.

The sudden occurrence of reflex iridoplegia has been noticed in several cases, sometimes preceding, sometimes succeeding the development of optic neuritis. The loss of the pupillary light reflex has been in some instances permanent and in others merely temporary. Myosis and inequality of the pupils have also been observed.

The authors draw attention to the occurrence of headache, vomiting, or both symptoms (in addition to optic neuritis), in lesions of the spinal cord, especially in spinal tumours and pressure lesions. This association was present in three of their cases and had been previously noticed : it has led to a diagnosis of concomitant spinal and intracranial lesions, which the subsequent course of the case has refuted.

The writers state that they are unable to advance any theory as to the causal relation between lesions of the upper part of the spinal cord and optic neuritis, and in this they fall into line with most of the previous writers on this subject. They hope to publish at an early date the results of experimental lesions upon the cervical cord in primates.

The conclusions arrived at by the authors are : (1) Optic neuritis of all degrees of severity may occur in connection with tumour, compression, myelitis, or hæmorrhage, affecting in some degree the upper part of the spinal cord ; (2) headache and vomiting may be, singly or together, associated with neuritis from a local lesion of the cervical portion of the spinal cord.

J. B. L.

VOIGT (Leipzig). **The Operative Treatment of High Myopia by means of Primary Linear Extraction of the Clear Lens, and its Results.** *v. Graefe's Archiv für Ophthalmologie, Band liv.*, 2 *Heft.*

While most ophthalmic surgeons, in removing the clear lens for high myopia, prefer to perform a preliminary needling, followed in a few days by extraction of the swollen and opaque lens matter through a linear incision, Voigt advocates a bolder technique, the clear lens matter being evacuated through a linear incision at the first operation without previous needling. He maintains that the objections urged against this method are theoretical rather than practical, and that the experience of the Leipzig University Eye Clinic is strongly in its favour. Among the chief advantages claimed are these :—

(1) Multiplicity of operations is avoided and therefore risk of infection lessened. As a rule only two operations were found necessary, viz., linear extraction and, later, needling of the capsule to obtain a clear pupil.

(2) Glaucomatous symptoms are much less frequently met with, viz., in 2 per cent. of cases as compared with 8 per cent. by the older method. From two-thirds to three-fourths of the total mass of the lens should be readily enough evacuated at the first sitting, and, as a rule, what remains undergoes absorption without trouble.

(3) The duration of treatment is much shortened. This is a point of importance, especially in working-class patients.

(4) Loss of vitreous is less frequent. As it is very generally admitted that this accident greatly predisposes to detachment of the retina, as well as to inflammatory complications, its avoidance is of primary importance.

In order to show statistically the advantages of this operative method Voigt cites the experience of the Leipzig Clinic. As regards the multiplicity of operations he finds that on 57 eyes operated on by the old method 178 operations were done, while by the newer technique on 81 eyes only 151 operations were needed in the course of treatment.

It is noteworthy, however, that the additional operative interference rendered necessary by the old method of treatment apparently consisted, for the most part, merely in a puncture of the anterior chamber.

Loss of vitreous occurred only in 4·6 per cent. of the cases operated on by the newer method, while by the older method it occurred in 17·4 per cent. of the cases. This difference is ascribed to the fact that, after needling, the operator has often to perform linear extraction when increased tension is already present.

As regards the selection of cases, Voigt, for his part, would give all patients with a myopia over 15 D. the option of operative treatment. Staphyloma posticum or choroidal changes near the macula do not, in his opinion, form a contra-indication if there are no retinal detachment and no pronounced changes in the vitreous. As regards the age limit he thinks the operation may be safely and readily performed up to 40 or even 45 years. Voigt approves of operating on both eyes in suitable cases, his object being to establish binocular vision and enable the patient to keep his work further away from the eyes. He thinks the progress of a myopia more certainly arrested by this than any other method. When, however, a patient has only the use of one eye he would be less inclined to interfere. The danger of the operation as shown in the series of cases quoted appears to be considerable, for three eyes were lost through infection out of 150 operated upon.

As regards the question of retinal detachment Voigt is of opinion that the operation does not predispose to its occurrence. This view he supports by a comparison of the relative frequency of detachment in highly myopic eyes with and without operation. Such a comparison seems to us very difficult to make without risk of fallacy, and only an extended experience of the operation can clearly establish the facts. The visual results obtained were highly satisfactory, the majority of the patients being nearly emmetropic after operation. Increase of the myopia after operation was not observed in any of the cases.

J. V. Paterson.

MAGNUS (Breslau) and WÜRDEMANN (Milwaukee). Visual Economics. *Milwaukee : C. Porth*, 1902.

The question of the amount of compensation justly due for the partial or complete loss of sight from accident or otherwise is one which has obviously great economic importance, and the computation of this compensation is surrounded by a dense and bristling hedge of difficulties. The basis of this work, which deals with this matter, is Magnus's *Leitfaden für Begutachtung und Berechnung von Unfallsbeschädigungen der Augen*, first published in 1894, and now translated, expanded and adapted to suit United States law, customs and conditions by the American author.

When one considers the vast array of different conditions required for active and unhindered employment of the sight under the endlessly varying circumstances of economic life and of the adaptation of the individual to that life, one cannot but feel astonished at the temerity of any attempt to reduce them to mathematical formulæ. To mention only a few of these difficulties, there fall to be considered all the various trades and occupations and their intimate ramifications; the minimum degree of vision required for the performance of each; the central vision of each eye separately, normal originally or subnormal; the field of vision and the relative value of its different areas; the integrity of the various ocular muscles. When the interdependence of all these various factors and others have been elucidated, one must then apply the achieved formula to the individual case with its peculiar "personal" elements. "We give definite rules whereby the probable loss of wages resulting from ocular accidents may be easily and definitely calculated, and we have established the fact that there is a certain relation of the earning capacity of the individual to the ability to use his eyes for his work. . . . We can exactly estimate the personal or economic damage resulting from accidents to the eyes in percentage, and in dollars and cents, and we believe that this economic damage should be the principal basis for the adjustment of all claims for pecuniary damages."

Now without the slightest desire to depreciate the excellent work done in this difficult chapter of ophthalmology and economics by Zehender, Magnus and others, we consider that this assertion is decidedly too bold, and is sufficiently refuted by a study of the book in question itself. To say that "we can exactly estimate the economic damage" is absurd, for it will be found that constantly throughout the rules given, standards are arbitrarily fixed, and on these are founded elaborate and professedly precise mathematical formulæ, which are thus to a great degree deprived of their value. We shall illustrate our meaning by an example: Regarding the allowance to be made for paralysis of an ocular muscle, we find (p. 69) "It may perhaps at first sight be deemed remarkable that we find such a great difference between the earning ability in the case where five extrinsic muscles are paralysed and the valuation of complete paralysis, for we have put down for the first instance an impairment of 53·675, while we state the latter as 100 per cent. . . . In specific cases where only one muscle remains functionable, for instance the rectus superior, a greater impairment of the working capacity might be found, for this muscle has but little influence upon the average vocation. If the rectus internus remains, the working capacity would be greater, for this is used much more often. Therefore we might give each of the extrinsic muscles a different valuation in considering the specific demands of the vocations in which the injured person has previously laboured, or we may get around this point by giving a higher valuation in such cases to the ability to compete; thus figuring not with the tenth but with a fifth or sixth root. By such a method we are enabled to simplify our mathematical calculations in specific cases, even though we treat all the ocular muscles equally. Thus by choosing the root exponents arbitrarily, the physician is allowed to express the individuality of each case. General calculations applicable for the individual values of each muscle cannot be given without doing violence to the peculiarity of the particular profession. Thus we hold it for the best to give each of the extrinsic muscles the same valuation, that is, one-sixth of the total value. We regard these figures as generally applicable to the lowest standard of the earning ability or the impairment thereof, leaving it to the calculator to change them eventually according to the specific demands of the particular case." When such uncertainty and difference of opinion exist on the principal question, what becomes of the one, two, or three figures after the decimal point? Yet an elaborate table is given (p. 126) based largely on this very uncertain foundation, showing the exact amount of damage done, first when the previous occupation was one necessitating the higher degree of acuteness of vision, secondly for the lower standard, for every degree of loss of central vision, going down by 0·05 steps, with loss of power of one, two, three, four, five and six extrinsic muscles of the eye. Thus, let us say, a man whose visual needs are of the higher standard receives an injury lowering his central vision to 0·65 and paralysing five of his ocular muscles; the value of such an eye is now 37·7. If only one muscle of another person is *hors de combat*, if his vision is now 0·30, and if he were on the lower scale, its earning ability is reduced to 37·6.

We have chosen for illustration the muscle question, but that is only one of several elements we might have selected—for example, the field of vision. But what we have said surely indicates that the proverbial German thoroughness is here pushed to extreme limits; Würdemann tacitly admits this when he says that he has cut off some of the figures beyond the decimal point. The fact is that the book exhibits the results of immense labour and care devoted to the study and elucidation of a question of extreme difficulty and great importance; the tables given of the relative values of the eye under many degrees of injury are most carefully constructed and devised; the relative losses ingeniously and thoroughly calculated; but as we believe this is done under the mistaken conception that all the factors can be deduced with the precision of a demonstration of Euclid or a problem in analytical chemistry. The book will, however, prove of very great value as a general guide in cases of difficulty, and for this purpose will chiefly be consulted.

EUGEN V. HIPPEL (Heidelberg). The Various Forms of Congenital Cataract and their Relationship to one another. *V. Graefe's Archiv für Ophthalmologie, liv.* 1.

From recent investigations we know that lamellar cataract and infantile nuclear cataract are identical in their origin, and that both, certainly in a number of cases, arise during fœtal life, and the close relationship in which fusiform cataract stands to them has been proved by the observations of Bach. Further, from the examination of a case of congenital total cataract, Hess has concluded that it also stands in the closest relationship to lamellar cataract, the injurious cause of the latter, by acting still further, leading to cataractous degeneration in the newly formed lens fibres. Hess has also directed attention to the fact that in cases of lamellar cataract, as well as in more or less clear lenses, the nucleus may be displaced backwards so that it touches the posterior capsule. In many of these cases there is a perforation of the lens capsule, which has probably arisen in early fœtal life. The view that between these various clinically differing forms there is this bond of a common origin, that they are all produced by the same cause acting in varying degrees of severity, is much supported by the results of the examination of a remarkable family of rabbits, of which in each of the six eyes of three members of one litter there was more or less cataract demonstrable, and more or less of the changes in other tissues which had led to the development of cataract. The affection of the eyes was discovered when the rabbits were four weeks old, and as the conditions did not change during the next five weeks it may be assumed that they were congenital, an opinion confirmed by histological examination.

On examination of the eyes clinically and histologically it was found that all six presented riband-like corneal opacity, posterior synechiæ, and dragging inwards of the ciliary processes and pars ciliaris retinæ; and that there was capsular cataract in all, small and circumscribed in three, but in the other three covering the greater part of the lens surface and presenting homogeneous flakes with abundant chalky deposit. In two eyes there was marked central cataract with normal equatorial zone and few or no changes in the anterior cortex. In another eye, where the nucleus showed similar changes, there was a transition to total cataract, the equatorial zone being partly cataractous. In a fourth eye there was total cataract; the nucleus had liquefied and become absorbed, but the cataractous equatorial zone was very narrow. The other eye of the same animal showed a much higher degree of resorption of the lens, so that it could be described as a membranous cataract. In all these five eyes there had been most probably a perforation of the posterior capsule, the opening being filled in with a cataractous tissue which here and there included lens *débris*, and in one case some lens substance lay actually outside the capsular sac on the posterior surface of the lens. This represents the transition to the sixth eye in which the cataractous changes in the nucleus were slight and the cortex appeared normal, but in which lens substance had prolapsed out of the capsular rupture and formed a lenticonus posterior.

Considering that we are dealing with the eyes of three animals from the same litter, and that the two eyes of the same animal present as great differences as those of two separate animals, we may fairly assume, says v. Hippel, that the same fundamental cause, working in varying intensity, has produced these changes, which it is certain have occurred in fœtal life. The displacement of the nucleus backwards can be explained with great probability by the rupture of the posterior capsule. If the closure of this capsular rupture were delayed, an adhesion of the lens with the posterior capsule could easily occur which the growth of later-formed lens fibres could not separate; and hence their inclination towards the posterior capsule, as is seen at the border of the cataractous nucleus.

The rupture of the posterior capsule may be explained by abnormal changes in the sheath of the hyaloid artery. Unusually thick fibrous bands in the region of the vascular sheath may have led to laceration in the posterior capsule through contraction or disproportionate simultaneous growth; these bands may have arisen as the result of inflammatory processes or of atypical differentiation.

The various appearances in these cases can be most easily ascribed to fœtal inflammatory processes. In favour of this are the presence of thick posterior synechiæ; the development of capsular cataractous tissue at the sites of synechiæ; the proportionate laceration of the ciliary processes; the irregularity in the condition of the uveal layer of the iris; and the frequent penetration of pigment cells into the capsular membrane. Further evidences are the presence of small collections of leucocytes, which prove that the process was not yet completed; the riband-like corneal opacity which was found in each case; and the important fact that blood-vessels were found inside the capsular cataract. This latter fact could only be explained by a perforation of the anterior capsule, which might result from the traction of the accumulated cicatricial tissue.

The course of events may probably be traced in this manner: An inflammatory process has thus attacked the different eyes in varying intensity; the riband-like opacity which each cornea bears as an evidence of this is most marked in the eyes with most posterior synechiæ and capsular cataract. Following the disturbance in nutrition produced by the inflammatory attack, the capsular epithelium and lens degenerated, and, in consequence of shrinking processes, rupture of the posterior capsule ensued. The gap was filled up by a capsular cataract and thence arose an adhesion of capsule to lens substance. In one case occlusion did not take place and the lens fibres grew outwards. After the inflammatory process had run its course (and it lasted a variable time in the different cases), lens fibres were developed, the plentifulness and quality of which depended on the condition of the epithelium.

L. VERNON CARGILL.

JAMES TAYLOR. Certain Anomalous Forms of Tabes Dorsalis. *British Medical Journal, July* 19, 1902.

In discussing certain anomalous forms of this disease Taylor, for illustrative purposes, regarded as a group those cases in which symptoms referable to the eye were the chief manifestations. A large number of these patients consult an ophthalmic surgeon in the first instance, chiefly on account of paralysis of one or another of the ocular muscles, or on account of atrophy. In his experience the muscle most commonly affected is the levator palpebræ; but along with this it is usual to find defect in certain of other muscles supplied by the same nerve. Ptosis alone, without any other ocular defect, is rare if unilateral; but a slight, though quite definite, degree of double ptosis is by no means uncommon in cases of tabes without any involvement of any other muscle. Besides this affection of the third nerve, and indeed sometimes apart from it, we sometimes meet with paralysis of either one or of both sixth nerves, most frequently of one. And it may be said generally of those ocular palsies occurring in cases of tabes that the paralysis is nearly always of a transient character, clearing up in a few weeks' time, usually under the influence of iodide and mercury, although such paralyses sometimes disappear when neither drug is being taken. It may be asked, Are such cases always definitely tabetic? Occasionally perhaps not, but in the great majority of cases at all events they are, for they have as a rule, associated with the symptoms above described, either pupils which are inactive to light, or lightning pains, not uncommonly in the distribution of the fifth cranial nerve, or girdle sensation, or loss of knee-jerk; perhaps all of these. Yet even in such cases the ocular paralysis may be no necessary part of the tabes. In some cases undoubtedly the knee-jerks are still present, and the pain in the head nothing more than might be accounted for without invoking the idea of lightning pains; but even such cases Taylor believes are tabetic, and he has known several instances in which true tabetic symptoms, in abeyance at first, were afterwards fully developed.

The same may be said of cases which seek advice first on account of defective vision. The defect of vision is almost invariably the result of optic atrophy—the grey atrophy which is by far the most common form of atrophy met with in tabes. If we see such a case in the early stage there may be only a slight degree of optic atrophy, with a corresponding defect of vision present. No other symptom, not even loss of knee-jerk, is to be found, although a few months later it is not uncommon to find that the knee-jerk has disappeared, and that the patient is having occasional attacks of shooting pains, not very severe, either in the arms or in the legs, or in both. Not at all infrequently the Argyll-Robertson pupil is present in those cases, but Taylor has been rather struck with the considerable proportion of cases of what afterwards proves to be tabes in which optic atrophy is present, which have no Argyll-Robertson pupil, and in which the pupil remains responsive to light, even when vision is almost destroyed.

There remains still to be mentioned a third class of cases in reference to ocular symptoms, that class, namely, in which the Argyll-Robertson pupil may be the only sign of really definite importance. Every now and then a patient may present himself in whom the Argyll-Robertson pupil is present in both eyes, associated usually with a slight inequality in the size of the pupils, but in whom there may be no other sign of tabes. Such cases, in Taylor's judgment, are nearly always of the tabetic type, and sooner or later they do develop some unequivocal sign of degeneration corresponding to the disease.

It is not infrequently stated that the onset of optic atrophy in a tabetic patient is followed by an arrest of the progress of the disease. This is a dictum which should be accepted with a certain amount of reserve. If this statement is intended to imply that optic atrophy in a tabetic patient prevents the onset of ataxy, then Taylor cannot accept it as true; he has, for example, known a patient who had been blind for some years as a result of tabetic atrophy develop very marked ataxy. Such an experience is undoubtedly rare. On the other hand, it is no doubt the case that in most tabetics who have optic atrophy ataxy is not present, and this is especially true of cases in which failure of vision from optic atrophy is an early symptom; but in cases in which other symptoms of tabes were quite marked, and atrophy only came on subsequently, the onset of optic atrophy has no modifying effect upon the symptoms of the disease. Yet it is no doubt true as a general rule that in tabetic patients with optic atrophy, especially if this is very severe and the affection of vision very profound, the other usual symptoms of the disease—especially the ataxy—are either not present or are present in a very mild form.

W. G. S.

OPHTHALMOLOGICAL SOCIETY OF PARIS.

JUNE, 1902.

Rapid Development of Myopia.—M. Sulzer exhibited a patient in whose case there was good reason to believe that myopia had developed with great rapidity in consequence of syphilis. The patient, a woman who was only 23, but looked much more, acquired syphilis in April, 1901, and from the first her symptoms were of the severest—glands, throat, and bones of the head being all attacked by the disease from the second month after infection. In March, 1902, she presented herself at hospital in a state of grave enfeeblement, complaining of violent pains in the head and chest, and great general weakness. On admission the patient showed numerous syphilides in various situations; she was promptly put under vigorous anti-syphilitic treatment. The patient had known for a long time that for practical purposes she had the use of her left eye only, but with it, up to a very few days before entering hospital, she was able to read, to see both at a distance and near at hand, and to decipher the names of the streets as she walked along. Immediately before her admission she had felt vision to become cloudy, and as if everything was enveloped in a faint mist. On examination a week later the lenses, especially that of the right eye, were found to exhibit faint opacities, most probably, so Sulzer thought, congenital in their origin. Except for that and the crescents to be mentioned immediately, the eyes appeared quite normal. Vision without lenses was less than $\frac{5}{50}$, but with – 10 D. it rose to normal in the left eye and to $\frac{5}{20}$ in the right. The peculiar point about the two crescents, which were not large, was their dull slatey appearance ; they had been noticed distinctly to increase in size during the time that the patient was under observation ; over certain patches about the apparent size of a pin's head the pigment which gave them their peculiar tint had become absorbed, leaving visible the choroidal structure. Sulzer was inclined to attribute the elongation of the globe which obviously must have been rapidly developed, to the violent and persistent encephalopathy, which had gone on for ten months unceasingly. Kugel has recorded two somewhat similar examples of rapid development of myopia along with violent head pains. Sulzer thus was of opinion that the choroidal affection and the consequent alteration of refraction were directly due to syphilis.

In the succeeding discussion, M. Antonelli upheld Sulzer's views ; he recognises as a clinical entity a syphilitic myopia. M. Chevallereau was not satisfied with the evidence as to the patient's previous condition of vision and refraction, nor was he prepared to exclude the condition of the lenses from a share in the causation of any refractive change which may have taken place in the patient.

Lesions of the Lachrymal Passages in the New-born.—M. Chaillous showed a female child, aged 8 months, who had been brought to him on account of lachrymation, which had lasted some five weeks. There was no affection of the conjunctiva, and the cause appeared to be an abnormal development of the bones of the nose. The superficial veins all over the head of the child were greatly dilated ; the abnormal development of the bony parts at the root of the nose appeared to have some influence in causing this, at least so far as concerned the anterior group of veins. The whole body and head of the child were covered with the scars of a skin eruption which had destroyed the hair of the head, the eyelashes and the eyebrows. The child weighed only 5½ kilos instead of between 7 and 8, the proper weight at its age of 8 months. It seemed probable, though not certain, that there was hereditary syphilis, which had caused an affection of the bones of the base of the skull resulting in the difficulty manifested in the return of the intracranial circulation, similar to that about the nose.

Lymphoma of Conjunctiva.—M. Valude had, at a recent meeting of the Society, shown (along with M. Morax) a case of this rare condition, in which, however, certain important symptoms were lacking. In the present instance, however, the picture was complete. The case was that of a man, aged 67, who had previously enjoyed excellent health. The present illness began two and a-half years previously with an affection of the throat, on account of which his left tonsil had been removed ; shortly after this the eye symptoms began. At the present time the two upper eyelids were pushed forwards by perfectly symmetrical growths ; the tumours were smooth on the surface, rosy or wine-coloured, and traversed by numerous blood vessels. The superior conjunctiva appeared as though distended by a sort of solid chemosis, and what was particularly remarkable besides the symmetry was the fact that the upper *cul-de-sacs* alone were affected by the condition. The lower sacs, the bulbar conjunctiva, and that of the lids were entirely unaffected ; the upper lids could not be everted on account of their thickened condition ; there was no increased secretion from the membrane, and no other pathological condition of the eye whatever. In addition to the growth in the neighbourhood of the eyes two other types of lesion were presented by the patient, viz., an engorgement and enlargement of nearly all the glands of head and neck, and a lymphomatous degeneration of the whole tonsillar region on the left side as well as of the posterior part of the soft palate. This was thickened and presented a white hyaline appearance ; the tonsil, where it had been cut, showed a bossy surface of a greyish white colour. The voice was nasal. As regards other organs the only thing to remark was that the right testicle was enlarged and hard, a condition which the patient asserted to have been of long standing. The liver and spleen showed no indication of enlargement, and except in the head and neck the lymphatic system seemed normal. A piece of the tissue from under the conjunctiva was removed without difficulty, but the bleeding was free ; the whitish, poorly vascular, lymphoid mass separated peculiarly easily from the capsule. Microscopic examination showed abundant lymphatic elements in groups round the enlarged vessels of the conjunctiva, and exaggeration of the normal arrangement of elements. The tumour itself consisted almost entirely of a mass of lymphatic cells with very little supporting tissue. No micro-organisms were found. Several months after the mass had been removed the patient was seen again, and by that time at least there had been no recurrence. The eyes themselves were entirely unaffected.

CLINICAL NOTES.

Treatment of Pannus by Electrolysis.—There are two classes of patients who suffer from trachomatous pannus—the first, in whom copious granulations of the upper lid are present, and the second, in whom the conjunctiva has practically become rid of these granulations, but the pannus persists. In the first of these of course the primary indication is to treat the lid, but in both great good may be obtained by electric treatment of the cornea itself; indeed such applications made to the conjunctiva are, in the opinion of Lor (Brussels), of great value in combating trachoma also.

To attack the pannus a current of 3 to 4 milliampères is employed, with the patient under chloroform; the positive pole is applied to the cheek on the corresponding side to the eye about to be treated, and the negative pole is played over the limbus corneæ so as to outline all that part attacked by pannus, destroying the circumcorneal tissues for a width of three or four millimetres. According to the thickness and resistance of the mucous membrane the surgeon should "go over" this area once or twice, so as to get quite down to the episcleral tissue. The main vessels of the pannus are also lightly touched up in the same manner. This method of treatment Lor has found to give results fully equal to those obtained by means of jequirity, while it is applicable to a much larger number of cases, and has not that element of risk and uncertainty of action which the other mode of attack so distinctly possesses.—*Annales d'Oculistisque*, March, 1902.

Instrument for Applying Grattage in Trachoma.—Jameson expresses the opinion that in trachoma the vigorous treatment frequently applied to the conjunctiva is successful at first because the superficial growth of follicles is destroyed, but is not permanent because in a large number of cases the deeper lying bodies remain untouched. This is specially true of "Grattage" applied by means of a tooth brush, as it often is. He therefore desired to have an instrument which would act in the same way but more efficiently, which could be applied again and again at brief intervals without the necessity of a general anæsthetic, and which yet was sufficiently vigorous to rupture even the tougher capsules which certain of the trachoma follicles possess. His aim was, "not the immediate extirpation of all granular growth but the repeated, successive and persistent attack upon the surface," and this he attains by means of an instrument consisting of a slender handle and a blade covered with minute pyramidal projections; these pyramids do not stand erect, but point backwards, and they are so placed that each has an abrupt posterior edge, two lateral ones and a long anterior one. As the granular surface is "ploughed over," so to speak, by the instrument, the edges cut their way into the granular bodies, while when the surface of conjunctiva is normal, there being no projections, the pyramids do not "engage" at all, but simply glide over it. To enable the instrument to suit and attack all varieties and degrees of granular surface, some with higher projections and deeper clefts between them than others, it is made in four degrees of roughness; and as, owing to the incline of the pyramids, its effect can be varied, and it is most powerful when drawn straight backwards, and least when pushed forwards, great varieties of vigour and of gentleness can be attained. The present writer has had experience of the instrument and has been well satisfied with its action. Under cocaine it causes little pain, and its efficiency is very marked.—*Ophthalmic Record*, February, 1901.

THE TREATMENT OF TRACHOMA WITH CUPROCITROL AND ITROL.—Among recent additions to our weapons directed against trachoma, cuprocitrol has been receiving some attention at the hands of v. Arlt (Graz), who employs it in strengths of 5 or 10 per cent. as an ointment, which is introduced well into the conjunctival sac, gentle but thorough massage being used immediately thereafter. For the introduction of the salve he uses a glass rod with a rounded end, and this he instructs the patient himself to employ twice a day to reapply the substance and keep up the effect; he says patients learn quite well to do this and he has never known anyone do any injury to his eye in the process. Should the conjunctiva contain numerous hard brawny granulations, it is better to begin with the 10 per cent. ointment thrice a day, but if in a few days this causes too much distress the weaker application may be employed. If, on the contrary, the conjunctiva is fairly smooth, if there are more cicatrices than granulations, it is better to employ a 5 per cent. ointment three times a day, reducing the frequency as improvement progresses. In certain cases, amounting only to about 5 per cent. of all, cuprocitrol cannot be borne, and in them itrol, a powder which can be dusted in like calomel, has proved very serviceable as a temporary expedient until the conjunctiva was able again to bear the application of cuprocitrol. Itrol has a certain inconvenience attached to its use, in that it is extremely susceptible to the presence of light, and also, says v. Arlt, to the acetylene compounds so apt to be present in the air when gas is employed for illumination; it has to be treated like a sensitive plate, and must be kept strictly from the light, and in a room containing no gas lights. He believes that the ill effects from its use which some have noticed are attributable to chemical changes having taken place from one or other of these causes. When pure, itrol has a very rapid effect in diminishing the secretion from conjunctivitis, whether trachomatous, catarrhal, or lymphatic. Ophthalmia neonatorum also he treats with itrol, dusting it in pretty freely twice a day after careful cleansing of the everted lids; in a few minutes this is lightly washed off, and every hour the lids are bathed with permanganate lotion. This mode of treatment has given v. Arlt the greatest satisfaction, and he warmly recommends it; it gives excellent results even in the severest cases.—*Wiener Klinische Wochenschrift*, 18, 1902.

FUNCTIONAL OR HYSTERICAL AMBLYOPIA.[1]

By R. Marcus Gunn, F.R.C.S.

The initial difficulty that presents itself to the clinical observer in this field is how to distinguish between an hysterical loss of visual function and malingering. The features common to both classes of cases are :—

(1) Loss of vision, in one or both eyes, partial or complete, usually sudden in onset.

(2) Absence of any ophthalmoscopic evidence of disease in the optic nerve, or elsewhere in the fundus, that will account for the visual failure.

(3) Absence of any impairment in the behaviour of the pupil to light.

Further, in functional cases, we frequently observe (*a*) that the character of the visual loss and other symptoms present cannot be adequately explained by any single lesion of the central nervous system, and (*b*) that the after-history of the case, particularly with regard to the improvement or recovery under certain forms of treatment, does not correspond with what occurs in any known organic disease.

Malingering will probably always remain a source of difficulty in this connection. It is to be suspected, naturally, when we discover that there is some decided object to be gained by the individual, *e.g.*, the recovery of damages on account of an accident alleged as the cause of the amblyopia, or visual defect brought forward as a reason for not undertaking some disagreeable duty. It is, of course, unsafe to judge rashly, but we cannot help being influenced by the impression the patient makes by his or her manner and general appearance. Apart from cases of traumatic origin, functional amblyopia is undoubtedly much more common in the feminine sex. It is in the case of women, however, that we have the greatest difficulty in detecting the malingerer, for the division between hysteria and deceit is by no means a sharply-drawn line. It is unnecessary for me here to recount the different familiar methods employed to detect feigned amblyopia, as, for example, by the use of a prism, coloured glasses and coloured letters, &c.

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[1] Read in the Section on Diseases of the Eye at the Meeting of the British Medical Association, 1902.

According to recent statements concerning hysterical amblyopia, however, such tests as these do not permit us to affirm that the visual defect is actually feigned. Indeed, it has been asserted that a true hysterical one-eyed blindness may co-exist with good binocular vision; in other words, that an eye that is unable to perform its functions alone is fit to take its part in vision when employed along with its fellow. If this contention be true, the explanation must be sought, I presume, in there being a double distinct central representation in consciousness (1) of each eye by itself, and (2) of both eyes together; and that, while the former is bereft of all function, the latter may still be active. That *fusion* is distinct from double uniocular vision is certain, but this present contention is a different matter entirely. I must admit that I cannot bring myself to believe in any such explanation, and prefer to accept the older, simple and intelligible view that binocular vision when found to exist in a case of alleged one-eyed blindness means *duplicity*, certainly, but not of cerebral representation.

Another class of case is not uncommon, where we have strong reason to suspect simulation as a cause of the visual defect. The patient, usually a young woman or girl, comes complaining of recent failure of sight in both eyes—with no history of any cause, or sometimes with an account of having suffered great pain on attempting to use her eyes. On being tested, distance vision is decidedly bad, say about $\frac{6}{36}$; with a weak convex lens it at once goes up to normal, and sight is said to be still clearer when the compensating lens is placed in front of this. I cannot see that there is any reason to regard the initial amblyopia as other than feigned in such a case, though one is always exposed to be met with the objection that it may have been real enough, but was readily removed by suggestion.

A recent observer indicates that in cases of one-eyed functional amblyopia there is often mydriasis on the same side. It would be interesting to ascertain whether anyone here has observed such a case, and has satisfied himself (1) that inequality of the pupils did not pre-exist; (2) that it was not associated with any loss of accommodation such as might be produced by the use of a mydriatic. Again, the same observer mentions that spasm of accommodation often occurs in the amblyopic eye, but we are not informed whether this actually co-existed with the above-described mydriasis, which would constitute a most singular combination, or whether it was not really found with miosis, the natural physiological grouping. The only instance of marked miosis that I can recollect in a hysterical person was that of a young lady who discovered that she could voluntarily produce a convergent strabismus with alternate fixation. It was associated with some dimness of vision, but all the symptoms disappeared on the detection of the nature of her interesting self-induced squint.

To return to the subject of the nature of the visual failure, complete double amaurosis would seem to be exceedingly rare. In my own experience I can only recollect a single case of this nature.

The blindness occurred suddenly in a young woman after the use of a mydriatic which had been employed for the purpose of examining her refraction; she protested that she was absolutely blind, but did not walk so slowly and carefully as a blind person usually does, stumbled over objects in her way, and even hurt herself by striking against articles of furniture which happened to be in her path. In other respects she was a somewhat hysterical girl, but I could never regard the amaurosis as being other than in great measure feigned. There was no ophthalmoscopic disease, but the activity of the pupils, of course, could not be tried. Admitted as an in-patient, she was told that next morning she would probably see much better, and that, at any rate, she would be able to count fingers. It proved next morning that her vision had returned sufficiently to enable her to see the hand-reflex, but she protested that she could not do more. She was then informed that next day she would be expected to read large type with glasses on. This she could not do, but could count fingers accurately at several feet. And so day by day, by a process of suggestion, perhaps, her vision gradually returned to normal.

It has been said that in cases of functional amblyopia, where the vision is not sufficient to enable the patient to guide herself, she may yet be able to do so with comparative facility, and the suggested explanation is that, although conscious vision is in abeyance or very greatly impaired, there is a power of guidance due to a connection between lower visual centres and motor apparatus. It would therefore, I presume, be directly comparable with the guiding influence of the visual impulse in fishes and reptiles through the mediation of an optic lobe.

As a rule, however, the loss of sight is either complete in one eye only, or partial in one or both eyes. In such cases great attention should be paid to the behaviour of the pupil to light. It is not sufficient to find that it contracts well or fairly well on exposure; the eye must also be kept under the direct stimulation of light, and the pupil watched as to whether or not it shows that secondary dilatation under continued exposure that is found associated with the amblyopia of retro-ocular neuritis. If the vision of one eye only is affected, it is important to compare the behaviour of the two pupils when stimulated directly or consensually. Thus, in partial affection of the right optic nerve the right pupil will show this secondary dilatation during continued exposure to direct stimulation, while the left pupil will show the same behaviour on consensual stimulation. On the other hand, on stimulation of the left eye both the right and the left pupil will behave normally. I need not remind you of the importance of this observation, inasmuch as it not infrequently enables us to diagnose a retro-ocular neuritis in the absence of all ophthalmoscopic evidence. Particularly is this important, since this form of neuritis not infrequently occurs in young hysterical women as a precursor of insular sclerosis, or in its early stages.

Occasionally functional amblyopia occurs in the form of homonymous hemianopia. This has been denied by several recent writers on the subject, but I have met with one or two cases of this nature. I may mention the following case here, though it is not an instance of simple hemianopia, but because it is certainly allied and presents features of interest :—

Mrs. R., aged 33, came to see me last January. She told me that the right eye was noticed to be defective after an accident when aged 13. Seven or eight years later the vision was regained, and for three years remained quite normal. At that time, *i.e.*, after the three years, she became totally blind in both eyes for six months. For some years later she had occasional fits of vomiting with intense pain in the head. About six years ago she became paralysed all over her body except her head; she was also totally deaf, and for a time never spoke. On examination there is complete blindness of the right eye; the left eye is quite blind on its nasal half, and the temporal field is reduced to within about 10° of the fixation-point. The pupils are equal, and react and behave normally both to direct light and on lateral illumination. Centrally the left eye with + 3 D. lens has V. $= \frac{6}{60}$, and she reads J. 8 well. The ophthalmoscope shows nothing abnormal in either eye. Dr. Beevor, who examined her, writes: "I find no evidence of organic disease, and conclude that the whole condition is functional, a traumatic neurasthenia attended with complete loss of hearing and sight, with recovery of the former and partial recovery of the latter." He was of opinion that she might suddenly recover vision.

The form of functional amblyopia of greatest interest and most free from the suspicion of simulation is that peculiar restriction of visual field which is found associated with functional hemiplegia and hemianæsthesia. In such cases the patient is not generally aware of the visual defect, but seeks advice on account of the loss of power in walking. On being examined with the perimeter, however, it is commonly found that there is a decided concentric contraction of both visual fields for white, this limitation being more marked in the eye corresponding to the side of the motor and sensory defect. In two such cases examined for me lately the fields showed this marked contraction. In the one case the field for white was contracted to an average of about 35° from the fixation-point on the hemiplegic side, while on the other side it was contracted to about 45° nasally, and about 70° temporally. In the other case, where the hemiplegia and hemianæsthesia had been of old standing, the field on the affected side was contracted to about 25 from the fixation-point, and on the other side to about 30°.

A considerable number of such cases are seen annually at the National Hospital for the Paralysed and Epileptic ; and the House-Physician tells me that he has never observed inequality of the pupils, though accurate notes are made in every instance. It has been said that in similar functional cases the field for red is greater than that for white or blue. I have now tested this in one or two instances, and have had it done for me in others, but have not met with this peculiarity. I admit, however, that I have not paid much attention to it, and have not taken the charts of the red and blue fields in such cases till recently.

Lastly, I must refer to the occurrence of functional amblyopia following injury. These cases are by no means uncommon, but I may give the following two in short detail.

Case I.—Rev. Mr. D., aged 32, came to me in September, 1893. In the preceding May he had a severe blow on the head in a railway accident ; three days later objects appeared dim and confused. The vision has been unsatisfactory ever since. The ocular movements are good, and the pupils are equal and react satisfactorily to light. Each eye has V. $= \frac{6}{12}$, not improved by any glass, no H.m. ; each reads Snellen 1·25 with a near point of 18 inches. The ophthalmoscope shows clear media and normal refraction ; both optic discs are unusually hyperæmic, but no pathological change is seen in either fundus. Fine movements of the eye are ophthalmoscopically observed like ordinary fine nystagmus, but rather sharper. Colours are well recognised centrally ; the field for red is small. Charts taken for white show decided and nearly equal limitation in both eyes, the outermost limit being about 40° from the fixation-point. On repeating the observation each field grew smaller in a spiral fashion, until at the end of the fourth chart the outermost limit was 20° from the fixation-point. I was afterwards informed by his doctor that a legal settlement had been arrived at, with award of damages, and that shortly afterwards this patient's sight became normal. I may add that neither the appearance nor behaviour under examination suggested malingering.

Case II.—Lieutenant C., aged 27, came to me on the 22nd of this month. He tells me that five years ago he had a fall from horseback, followed by concussion and dimness of sight; he could not see to read for about five months after this accident. In May of this year while in South Africa he met with a very similar injury, again followed by concussion and by inability to read. He says that at first he saw double. He is a well-built man, of good physique and ingenuous appearance. The ocular movements are good, and there is no diplopia. The pupils are equal and active. The right eye at first saw no letters at 6 metres, after a little time the V. $= \frac{6}{60}$; cannot read J. 15; left eye, V. $= \frac{6}{60}$ and small words of J. 15; binocularly, V. $= \frac{6}{60}$ only. Optic discs are normal, and fundi satisfactory. Fields for white showed considerable limitation of a somewhat irregular character. There was no marked spiral contraction on a second and third testing. A drop of water was then put in each eye, and he was asked if this had improved his vision to any marked degree. He said that it had, undoubtedly, and now read $\frac{6}{18}$ perfectly binocularly and Jaeger 14 fairly. This may be accepted, not necessarily as a proof of simulation, but as an instance of the power of suggestion.

Of interest in connection with traumatic hysteria is an observation made at the National Hospital in the case of a man suffering from insular sclerosis. He had previously been troubled with defective sight in each eye, and the discs showed the usual evidences of past retro-ocular neuritis such as are met with in this disease. While in the hospital he happened to prick his thumb rather severely with a pin. Following this small injury, which seemed to give him a considerable shock, he became practically blind in both eyes, remained so for about three days and then suddenly recovered.

To sum up shortly, cases of functional amblyopia fall into two great categories :—

(1) Idiopathic, usually occurring in women, but sometimes met with in children (about 9 to 14).

(2) Traumatic, occurring probably equally in both sexes, but always, so far as my experience goes, in adults.

As to the nature of the affection of the nervous system underlying hysterical manifestations, we are still absolutely in the dark. That many forms have an element of simulation there is, seemingly, little doubt. The fact that in many cases no single central lesion will account for all the symptoms is conspicuous. It may be true, sometimes, at least, that such lesions actually exist, so that in these instances we have to deal, not with a pure functional disorder, but with an obscure early manifestation of real organic disease. The knowledge that many hysterical persons subsequently become affected with an ailment such as insular sclerosis must make us pause before dismissing them as of little or no importance. As a working hypothesis we can assume that there is in most, if not all, cases a temporary, partial or complete, loss—whose nature is as yet unknown—of the power of conduction between the lower or middle visual centres and the highest conscious centres. In this connection it may be useful to draw attention to the cases of supposed blindness in very young children that occasionally come under observation. Such a child is taken to the surgeon with the mother's statement that "it takes no notice of anything." On examination we find that it pays no attention to moving objects brought near to it, yet ophthalmoscopically there is nothing amiss, and the prognosis is really favourable. I have thought that in such infants of delayed visual consciousness there might be some retarded development of higher association-fibres. As I have remarked elsewhere, "It would appear as if there were some similarity between these cases and those which, occurring later in life, we call 'hysterical amblyopia.' In both the retina is perfect, the optic nerve is quite able to conduct impressions, the tracts are normal, the sight-centres presumably fit for work and actually receiving impressions, and yet there is no consciousness of these impressions, or such a diminished consciousness as to occasion no actual response."[1] In the hysterical individual the association-fibres had been normally developed and previously efficient, but from some unknown cause they have ceased to conduct. Suggestion, the power of a strong will acting upon the weaker one, a shock, or surprise, or a voluntary strong exertion of the patient's own will is sufficient, in an early stage, at least, of the affection, to re-establish this lost conducting power for a time. It would seem that in hysteria we have to deal with a very susceptible nervous organisation, possibly a malnutrition, and it is a well-known clinical fact that this nerve peculiarity may be inherited.

What I have said above indicates the lines of treatment usually most successful. Removal from home surroundings is of importance when it can be arranged; when it cannot, the friends must be cautioned against the impropriety of drawing attention to, or showing sympathetic regard for, the symptoms. Healthy surroundings and a judicious nourishing diet are necessary. Further treatment consists in the employment of the time-honoured and unquestionably beneficial remedy, asafœtida, given in large doses, and in the use of faradism.

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[1] Internat. Clinics, Vol. I. Second Series, p. 182, 1892.

SUDDEN TEMPORARY LOSS OF VISION, PROBABLY OF CIRCULATORY ORIGIN.

By James W. Barrett, M.D., Melbourne.

Cases of sudden transient blindness are not frequent; the following notes may, therefore, prove of interest.

A. B., aged 60, had been working hard, physically, for two weeks, and after lunch, on May 12, lay down to sleep, and slept from 2 p.m. till 4 p.m. On waking, he felt something anomalous about the right eye; he thought that the eyelids were closed, and tried to open them with his finger, and finding that they were open, "almost instinctively" closed the left eye, and found that he was quite unable to see light. He repeatedly tested the eye, but the condition remained unchanged until 6 p.m. A lamp and candle were then brought in, and patient again tried to use the right eye, and found that he could now see the flame of the candle, but both above and beneath the flame there was perfect blackness, in which the candle stood out. Gradually the density of the blackness decreased, and then came a sensation as if a curtain were gradually dropping from before the eye. The heads of pictures became visible first, that is, the upper part of the field was restored before the lower, and by 7 o'clock the patient could see as well as ever. He had had pains in the head for a week before; at first a dull aching in the occipital region, which later, according to his expression, "settled in the pupils of the eyes, especially in the right"; since this occurrence he still at times feels these dull pains. His general health has been excellent; he has had "influenza" several times, but has always "battled through" it. He had gonorrhœa and a soft chancre over thirty years ago, but not syphilis. He came under observation for the first time on May 13, the day following the sudden loss of sight. His vision on that date under homatropine was, in each eye, with $+\ 3{\cdot}0$ D. sph. $\frown\!\!\!\smile$ $+\ 0{\cdot}5$ D. Cyl. axis $180° = \frac{6}{5}$ partly. The fields were normal. The right disc was perhaps a trifle paler than the left on the outer side; the superior nasal vein was constricted near the disc. On applying pressure pulsation was produced in the vessels of the fundus, most readily in the inferior vessels, and not at all in the superior nasal vein. Where the arteries crossed veins they appeared to compress them. There was no evidence of any alterations in the retina itself. The pulse rate was 46 per minute. The temporal arteries were very tortuous. The pupils were equal and reacted normally to light and accommodation. The patient had a high degree of nerve deafness on both sides, probably of influenzal origin. I thought the radial artery somewhat atheromatous, but Dr. Maudsley found no evidence of cardiac, arterial, or renal diseases.

In the *Intercolonial Medical Journal for Australasia*, ii., 1897, I attempted to draw conclusions respecting certain phenomena connected with these sudden losses of vision of circulatory origin, from an analysis of the literature which was available. One of the questions of importance, in connection with such conditions as that at present under consideration, is the duration of the loss of vision which is compatible with recovery of sight—what length of time is the retina capable of being deprived of blood supply (as indicated by the loss of vision) and yet of subsequently not suffering permanent damage. From certain cases reported it would appear that any loss of vision occasioned in this way, lasting more than one hour, was very apt to be followed by some permanent damage in the form of some limitation or of some eccentricity of the field. There is, however, a case reported by Noyes in Loring's Text-book, in which a total loss of vision extending for a very much longer period had been followed by complete recovery. The present case is interesting from this point of view. Complete loss of vision for at least two hours has been followed by complete recovery, the only permanent demonstrable result remaining being some abnormality of the superior nasal vein. Of course, the completeness of the deprivation of the nervous layers of the retina of blood is an assumption. It is always possible in these cases, the pathology of which is probably embolism *plus* spasm, that the circulation is not wholly arrested. It is nevertheless important to obtain some clinical data respecting the relationship of complete recovery to the total loss of vision.

The notes of the case were kindly taken for me by Dr. Orr, Assistant-Surgeon to the Victorian Eye and Ear Hospital.

REVIEWS.

A. BIRCH-HIRSCHFELD (Leipzig). The Pathogenesis of Chronic Tobacco Amblyopia. *von Graefe's Archiv, liii.*, 1, and *liv.* 1.

After a critical survey of the recent publications on the subject, the author gives a detailed description of a case which had been under observation at the University Clinic for a little over seven years, and of which the posterior parts of the retina with the optic nerves and chiasma were obtained for examination. As a result of these observations the following conclusions are arrived at:—

(1) The optic nerve is affected in all its three component tissues, viz., the nerve tissue, the connective tissue, and the neuroglia.

(2) The thickening of the septa gives an appearance which is quite different from simple grey atrophy, and is due, according to the author, partly to a purely physical

contraction of the tissue, which is rich in elastic fibres, and partly to proliferation of the connective tissue itself.

(3) No traces of a progressive interstitial inflammation of the connective tissue could be found, and the degeneration of the nerve fibres did not appear to be due to atrophy from pressure or constriction. The proliferation of the neuroglia appears likewise to indicate that the process has to be interpreted as a primary degeneration of the nerve fibres, with consecutive proliferating changes of the interstitial tissue.

(4) The ganglion cells of the retina showed well-marked degenerative changes analogous to those obtained experimentally in methyl-alcohol poisoning. The affected cells were distributed irregularly throughout the retina, and in close proximity to normal ganglion cells. The other layers of the retina showed no marked changes.

The anatomical examination, therefore, does not speak in favour of a primary interstitial inflammation of the optic nerve, but against it. This latter view is corroborated by the analogy of the anatomical changes in experimental alcohol amblyopia. The author is, therefore, of opinion that the nerve degeneration is not secondary to the connective tissue changes, but is due to the specific effect of a poison on the nerve elements themselves, and takes place at the same time as, or even before, the proliferation of the neuroglia and other connective tissues; and it seems probable that the ganglia of the retina are affected before or at the same time as the nerve fibres.

The marked difference between the appearance of the degeneration of the optic nerve in toxic amblyopia and in simple atrophy may probably be best explained in this way: that in chronic nicotin and alcohol poisoning, which lasts through many years, there exists a tendency to chronic proliferation of the connective tissue in the optic nerve as in other organs of the body. This occurs distinct from the degenerative processes that take place in the more highly differentiated cells, such as ganglia, &c. Such proliferation is likely to occur readily where the local conditions have been rendered favourable through the retrogressive changes of the normal tissue; but it does not follow that the new formation of connective tissue must be considered as a simple process of reparation.

The second paper gives an account of experimental observations made on four dogs and three monkeys. In a previous paper the results were published of similar experiments on rabbits and chickens, and although these results had been very uniform, it was thought that they hardly allowed any safe conclusions to be drawn as to the conditions existing in man, especially as there was no possibility of ascertaining the presence of subjective defects of vision, nor of making an ophthalmoscopic examination in the chicken. A short review of the latest publications on the subject precedes the statement of the author's own results. The dogs had the drug administered (by stomach tube) in the proportion of equal parts of methyl-alcohol and water, the monkeys in greater dilution (3 to 20). In all the toxic symptoms were very strong and rapid; in almost all dangerous from the first. With regard to the optic apparatus, well-marked changes in the structure of the retinal ganglia were found in all cases before any morbid alterations could be traced in the optic nerve. These changes occurred evenly distributed throughout the whole retina, normal ganglia being found in close proximity to slightly or more severely affected ganglion cells. These changes appeared to be due to a direct toxic effect. How far they would involve a disturbance of vision, which they would most likely cause from the very first, is difficult to conjecture, considering that at least in the earlier stages a large number of normal nerve-cells remain in the retina. The enlargement of the pupil and its retarded reaction to light suggest the existence of visual impairment pretty early.

In one monkey both clinically and by *post-mortem* examination the existence of so-called optic retrobulbar neuritis was evident. This affection could not be interpreted as caused by the retinal changes, but as an independent process due to the toxic agent. The interstitial tissue of the optic nerve was found to be free from infiltrating processes at a time when the degeneration of the nerve fibres had already reached a high degree; no signs of proliferation could be detected in the connective tissue septa, nor in the neuroglia. It follows, therefore, that the primary localisation of the toxic injury must be looked for in the nerve substance itself.

Whether the degeneration of the nerve fibres is helped by other causes remains doubtful. It is possible that an œdematous condition co-operates with the toxic effect, such œdema being caused by the dilatation of the veins, as seen already by the *intra vitam* help of the ophthalmoscope.

It may therefore be assumed that pathogenetically the methyl-alcohol amblyopia begins as a toxic effect on the structure of the retinal nerve cells and often remains thus limited. Secondarily, an ascending degeneration in the optic nerve may follow. In addition to this, an acute retrobulbar optic neuritis may appear with an extensive partial degeneration of nerve fibres, accompanied sometimes by complications from the part of the blood and lymphatic vessels, viz., venous stasis and œdematous infiltration. Both neuroglia and septa are only secondarily affected, while cellular infiltration of the optic nerve is completely absent.

With regard to the chronic tobacco-alcohol amblyopia in man, the experimental investigations into the acute toxic neuritis, together with the clinical facts, make it probable that a toxic retrobulbar affection is the primary cause. This affection the author considers to be situated primarily in the nerve fibres (helped, perhaps, by an œdematous process), and followed secondarily by an affection of the interstitial tissue. K. G.

O. HAAB (Zürich). Secondary Atrophy of the Optic Nerves after Macular Disease.—*Beiträge zur Augenheilkunde, Band v., Heft* 50.

Some years ago Haab observed in the optic nerve a change which he had not found mentioned in atlases or literature. It is a pallor of merely a part of the optic disc indicating a more or less marked atrophy. In most cases it is the temporal half, much less often the upper or lower half, that is affected by the discoloration. The pallor in the temporal part is most frequent and most marked in the temporal quadrant, the part where the changes in toxic amblyopia are most marked, but may spread up or down the temporal half so that the abnormal gradually fuses with the normal colour. The temporal quadrant of the optic disc has not the opaque pallor of toxic cases, but has a transparent, bright blue-grey colour such as is seen in genuine atrophy, in the discoloration after loss of conduction, in those rare toxic cases where there is actually atrophy of the papillo-macular bundle, or lastly, in those cases of retrobulbar neuritis that cause atrophy of those bundles. Only in those conditions the atrophic discoloration is usually more marked, and occupies a larger area than it does in the forms described by Haab in this paper. In Haab's cases there is an ascending secondary atrophy in the region of the macular bundles, brought about by severe disease at the macular lutea. The particulars of a number of cases are given in this article to illustrate this and other points brought forward by the author. Only a small number of the cases of macular disease result in secondary ascending atrophy, and the loss of function of the central part of the retina is not in direct relation to the change in the optic nerve. There may be a large white patch, including the whole of the macular region, and marked disturbance of vision, without pallor of the temporal part of the optic nerve, as is often seen in myopia. Again, as the result of holes at the macula, with marked disturbance of vision, pallor of the temporal quadrant of the papilla has not been noticed even after long observation, although in exceptional cases it was subsequently observed.

On the other hand, only a trifling spot, the result of injury, may be present at the macula, and yet pallor of the optic disc appears. Further, disseminated choroiditis at the posterior pole may lead to the formation of numerous spots without disturbance of vision (common in this disease), or may cause so severe a lesion of the retina that secondary atrophy at the temporal part of the optic disc ensues. If atrophy of the retina extends upwards or downwards from the macula, then the atrophic pallor also affects the papilla above and below the temporal quadrant.

Atrophy of the retina at a part other than the macula only causes pallor of the optic disc when it involves an area much larger than the macula. The secondary atrophy then lies in that part of the papilla which receives retinal nerve-fibres from the atrophied retinal area.

Evidently, atrophy of the papilla only results when the retinal elements of the anterior retinal layer and, indeed, the ganglion cells are destroyed. It is for this reason that in myopic macular disease, or in disseminated choroiditis of the posterior pole, the papilla is not so readily affected, in spite of marked central visual defect, because the lesion only affects the layer of rods and cones. In those diseases of the macula, on the other hand, in which we may suppose that the whole thickness of the retina, including the anterior layer, is destroyed, *e.g.*, in so-called coloboma of the macula, the papilla is affected, and particularly the temporal part corresponding to the situation of the macular bundle.

This secondary atrophy of the papilla may in the meantime be fairly satisfactorily explained by means of the theory of neurons. According to Greef, the first neuron in the retina that is stimulated by light is a rod or cone and the corresponding fibre with nucleus. The second neuron is formed by a so-called bipolar cell, which carries the impulse forwards to the third neuron. The latter is a ganglion cell with its axis cylinder process, which extends through the nerve-fibre layer to the optic nerve, and further as an optic nerve-fibre to one of the three primary optic-centres in the brain. A fourth neuron conducts the impulse from here to the cortex of the occipital lobe. These neurons are not firmly connected, but are brought more or less into intimate contact merely through end twigs or knobs. The posterior layer of the retina may be destroyed or atrophied without the disappearance of the nerve fibre or ganglion-cell layer, and, on the other hand, atrophy of the nerve fibres may be observed without the disappearance of the layer of rods and cones. From this we may assume that in the retina the atrophy does not pass from one neuron on to the next.

The reason that destruction of the anterior layer of the macula causes such a marked atrophy of the papilla, whilst that of an extra-macular part of the retina only when it includes a much larger area than the fovea and neighbourhood, is because the macula contains an enormous number of ganglion cells, from each of which an axis cylinder process is sent to the optic nerve. These form a large part of the optic nerve—from one-fourth to one-third. When the ganglion cells of the macula are destroyed a large number of axis cylinders atrophy and the temporal quadrant shows marked pallor. If, on the other hand, an extra-macular part of the retina is destroyed, since this contains much fewer ganglion cells, even if it is much larger than the macula, then naturally fewer nerve-fibres are atrophied. A large part of the extra-macular retina, therefore, must be destroyed in order to produce an appreciable pallor of the papilla.

Why holes at the macula are not as a rule followed by secondary atrophy is explained in this way. By comparing the measurements of the holes and the fovea it is estimated that a hole occupies merely the central part of the foveal depression. The ganglion cells are peculiarly numerous at the edge and surrounding zone of the depression, but rapidly diminish in number towards the bottom. Therefore, as a hole at the macula usually reaches only to about the middle of the declivity of the fovea, it destroys, as a rule, but a moderate number of ganglion cells, and thus only a moderate number of axis cylinders atrophy.

Secondary pallor of the papilla after lesion of the macula or other larger parts of the retina shows us whether such a lesion has also destroyed the anterior layer of the retina or not. If pallor of the papilla has not appeared after disease at the macula though central scotoma has been present for a long time, we may suppose that it is the layer of rods and cones which is chiefly affected.

That the atrophy may advance fairly rapidly towards the papilla is shown by a case of the author's (No. 8) in which pallor of the optic disc was noticed six weeks after traumatic macular disease. That the pallor of the optic disc in Haab's cases actually depends upon atrophy can scarcely be doubted from the investigations of Pick and others.

The ascending atrophy described in this paper strengthens the view that the so-called genuine atrophy of the optic nerve, as is seen in tabes, takes its origin not in the optic nerve but in the retina. This view has much in its favour, but still requires further proof. It is clear that disappearance of the third neurons produces no ophthalmoscopic appearance. Haab appears to favour the view that in toxic amblyopia the disease begins in the retina at the macula and ascends towards the optic nerve. He has difficulty in understanding how an interstitial neuritis should select the papillo-macular bundle in the optic nerve and single out amongst its fibres particularly those for red and green. He believes that only in the minority of cases, viz., those that do not clear up, it may play a more or less important part. In most cases the healing of this affection is so rapid and typical, when appetite improves, that one would rather think of a less severe disturbance which would be most naturally referred to the third neuron of the retina, and particularly to the ganglion cells of the papillo-macular region. C. H. U.

POSEY (Philadelphia). Transient Monocular Blindness. *Journal of the American Medical Association May* 31, 1902.

Under three circumstances, in addition to the mechanical hindrance from the presence of tears or other discharge, patients are found to suffer from transient monocular blindness, these three conditions being fatigue of the ciliary muscle, early or threatened glaucoma, and migraine. But besides all these conditions, Posey has had experience ot several cases in which a transient failure of sight, more or less complete, was complained of, and yet, as we shall see from a brief notice of some of his cases, no evil result followed. The case which first drew the author's attention to the possibility of such an occurrence taking place was that of an elderly man who complained of sudden loss of vision of the right eye; this had come on with extreme suddenness half an hour before Posey saw him, the complete blindness had lasted about fifteen minutes, sight had then gradually returned, so that even by the time of the author's interview with the patient vision was perfectly restored. On ophthalmoscopic examination, nothing abnormal whatever was to be made out, further than that the arteries gave indications of the presence of arteriosclerosis, and the veins were slightly enlarged; there was no difference in aspect between one eye and the other. On correction of the refractive error, vision was perfect in each eye. On enquiry it was found that a similar, but even more brief, attack had taken place in the same eye about three weeks previously; three days after the first interview the patient returned, even more alarmed than before, stating he had had yet another attack, lasting on this occasion about five hours, though with partial remissions. As the fundus still showed nothing, the patient was earnestly advised to seek medical advice on account o the sclerosis of vessels which was markedly present. This he did, was put under vigorous and suitable regimen and treatment, and since that date has never had another attack, a period of two years. His physician reported that heart and kidneys were quite sound, and his general condition very good, considering that his small joints were much crippled by rheumatoid arthritis. His attacks were never associated with nausea or headache; on the last occasion at least, when particular attention was given by the patient to the matter, recovery of the vision, which had been absolutely lost, was observed to begin in the temporal portion of the field.

A second case was that of a man of 30, who first came under Posey's care on account of a refractive error.

About a year later he returned, saying that he had had two attacks of transient blindness, or at least of partial blindness, for only the lower halves of objects disappeared from sight. No headache followed the loss of sight. On another occasion, the right eye became absolutely blind for a quarter of an hour. Three months later, after reading, he noticed a dark patch over the central area of the field; this positive scotoma persisted for about half an hour, and then passed slowly away. One month later, the upper half of the right eye became totally blind for fifteen minutes; six months later it was the lower half of the same eye. Nine months later the same eye became completely blind again, the blindness beginning in the lower half of the field. The patient was feeling in perfect health at the time; the attack came on while he was standing speaking to a friend in the street. Since then he had had several attacks. He had never been examined during an actual attack, it is true, but on no occasion had any pathological condition been found in the fundus; he had had rheumatic fever, and came of a gouty family.

In a third case the patient was a man of 60; his first attack lasted more than an hour; he had subsequently six of these, sometimes in one eye, sometimes in the other, but all coming immediately after he had taken a mid-day nap; some of the attacks lasted a much shorter time than the rest. On examination vision was full in each eye, the ophthalmoscope showed discs which were possibly a little paler than is quite usual, the veins also were slightly distended and tortuous.

After referring to the views of Nettleship, Priestley Smith, and others who have described similar cases, and giving particulars of one or two other examples, which only differed from these in that they ended in more or less complete loss of sight, he concludes somewhat in these words:—"In view of the uncertainty regarding the nature (probably a spasm of the artery) and outcome of these attacks, it is of the greatest importance to prevent a recurrence of them, by combating any tendency towards endarteritis, as it is probable that the spasm in the walls of the vessels is induced by such a process. It has long been a recognised fact that iridectomy, by causing a dilatation of the blood vessels, reduces intraocular pressure. This operation has accordingly been performed in a number of cases of transient monocular blindness with a view to preventing subsequent permanent blindness. Wagenmann would have it performed in every case of this nature. In view of the uncertainty regarding the cause and the course of these cases, it does not seem proper to the writer to subject an eye, which may remain permanently healthy, to an operation which, in a certain proportion of instances, no matter how skilfully performed, renders the eye useless for visual purposes. He would, however, insist upon a treatment and a regimen to combat arterial sclerosis. At the time of the attack the nitrite of amyl has been found of service, and gentle but active massage of the eye should always be practised."

W. G. S.

AMERICAN MEDICAL ASSOCIATION—SECTION ON OPHTHALMOLOGY.

MEETING HELD JUNE, 1902.

Dr. FRANK ALLPORT in the Chair.

Serpiginous Ulcer of the Cornea.—C. J. Kipp (Newark, N.J.) called attention to certain clinical features of prognostic importance. In certain cases, from the margin of the ulcer, straight greyish lines diverge in all directions somewhat obliquely through the parenchyma of the deepest layers. The further ends of these diverging lines are connected by greyish intermediate striæ, which, if present all around, form a complete ring of the same form as the ulcer, but situated more deeply in the parenchyma, and 3 to 4 mm. distant from the margin. The cornea outside of the outer ring is usually of about normal transparency. The hypopyon is not very large, and symptoms of irido-cyclitis are not very severe. Blennorrhœa of the sac may be present or absent. In this class of cases the use of the galvano-cautery or Sæmisch's incision is not only unnecessary but harmful, as the ulcer will heal under warm applications, cleansing and mydriatics. In other cases the opaque lines encircling the ulcer are absent, the hypopyon is large, symptoms of irido-cyclitis are more intense, and the tension of the eye is often increased. In this class of cases the advancing infiltrated portion of the margin should be destroyed by the galvano-cautery at once, and active antiphlogistic treatment directed to the irido-cyclitis.

Operation for Pterygium.—J. O. McReynolds (Dallas) described a modified transplantation operation. He grasps the pterygium where it crosses the corneal margin, and dissects up the corneal portion. With straight scissors he makes an incision along the lower border of the conjunctival part of the pterygium, extending 6 to 12 mm. from the corneal margin. No incision is made along the upper border of the conjunctival part of the pterygium. The growth is carefully dissected up from the sclera with any small non-cutting instrument. The conjunctiva below the incision is separated from the sclera. A thread armed at each end with a small needle is passed through the free end of the pterygium ; both needles are carried beneath the conjunctiva and brought out at the lower fornix, 3 to 6 mm. apart. The loosened conjunctiva is then raised and the free portion of pterygium drawn under it by traction on the ends of the thread. The tightening of the ligatures holds the growth firmly in its new position, and leaves in its former position along the corneal margin smooth stretched conjunctiva.

Thiosinamin for Corneal Opacities.—G. F. Suker (Chicago) had employed this drug on account of its recognised resolvent power in keloid, lupus, urethral stricture, and other affections. He considered it valuable in corneal opacity from any cause. It may be administered internally in capsule, or in solution, made with glycerine to prevent its disorganisation, in doses of one to three grains three times a day. It may also be given hypodermically, and sub-conjunctival injections are not specially painful. A 10 per cent. ointment may also be employed. He is accustomed to give it for a period of five or six weeks, and then to intermit for a week or ten days. It should not be used freely by a patient suffering from tuberculosis or rheumatism.

Foreign Bodies in the Eye.—O. Haab (Zürich, Switzerland), by special invitation, addressed the section upon the removal of foreign bodies from the eye. The majority of such foreign bodies are attracted by a magnet. Those not so attracted can only be removed when visible, so that they can be seized with forceps. For this purpose he had been pleased with the Desmarres capsule forceps. They can be used through a small opening, and occasion the least disturbance of the vitreous. For bodies influenced by it the electro-magnet was the instrument with which to effect their extraction. He considered it of the highest importance that there should be as little as possible disturbance of the vitreous. This was the reason for employing a powerful magnet, one that would act on the foreign body without requiring to be introduced within the sclera. Some had advised the use of magnets of different strengths, inversely proportioned to the probable size of the foreign body. This he considered unnecessary, comparing it to the precaution of the philosopher who cut a large hole for his cat and a smaller one for the kitten. He found that the action of the most powerful magnet could be so controlled as to serve when only a feeble attraction was required. It was not even necessary to have special apparatus for modifying the electric current. The magnetic force could be diminished more promptly by simply pushing the patient's eye away from the tip of the magnet. The X-rays and the sideroscope were valuable aids in diagnosis, but generally unnecessary when a giant magnet was available.

His conclusions were based upon a series of 165 cases. In 134 of these the fragment of iron or steel was situated behind the lens, and in three of them was successfully extracted from this situation. In but seventeen of these cases had the foreign body entered the eyeball through the sclera. In eighty the lens had already been damaged in the original injury. In the last thirty-eight operations he had not once used the small magnet; and in 120 cases had used it but three times. In the 165 cases there were twenty-four failures to extract the foreign body, either because it was too firmly embedded, had become entangled in exudate, or was drawn into the ciliary region, or into the tissue at the side of the wound. In seventy-one cases useful eyes were secured. Foreign bodies firmly embedded may be loosened with a needle, and then drawn out with a magnet. But if long healed over at the back of the eye, they had better not be interfered with. To combat infection, he advised the introduction of iodoform-gelatin rods into the anterior chamber, or even the vitreous.

W. M. Sweet (Philadelphia) considered that the exact location of the foreign body should be determined by means of the X-rays before its removal is attempted. Foreign bodies that have become enveloped in a fibro-cellular mass cannot be dislodged with a magnet; removal with forceps and filling the eyeball with salt solution is, in such a case, an operation worth trying.

Restoration of Conjunctival Sac for Prothesis.—J. E. Weeks (New York) believed that the difficulty in restoring the upper and lower cul-de-sacs, so that an artificial eye can be worn, was due chiefly to the shrinking which took place in the flap when this was not firmly attached to tissue that would resist shrinking. He described the plan he had adopted in seven operations. The incisions for restoring the cul-de-sacs are carried to the periosteum at the margin of the orbit. The flaps were taken from the inner surface of the arm, and fastened to the orbital margin with sutures. To maintain the conjunctival space he used a shell composed of several layers of sheet-rubber tissue, moulded together and lubricated with bichloride vaseline.

Symmetry of the Refracting Surfaces of the Two Eyes.—H. Knapp (New York) pointed out that the visual apparatus is a dual organ, symmetrically placed with reference to the median plane. In about 2,500 cases of astigmatism the principal meridians were symmetrically placed in 80 per cent. If differences of not more than ten degrees had been neglected the proportion of symmetrical cases would have been much larger. On account of this symmetry he urged the adoption of a plan of notation for the meridians of astigmatism, beginning with zero at the nasal end of the horizontal meridian for each eye. By it symmetrical meridians would be similarly designated.

Types of Uveitis.—G. E. de Schweinitz (Philadelphia) divides the cases according to their etiology. Excluding those dependent on traumatism or sympathetic disease, there are those depending on (*a*) constitutional diseases—rheumatism, gout, and diabetes; (*b*) specific infectious diseases—syphilis, tuberculosis, and scrofula; (*c*) diseases of the blood—anæmia; (*d*) local disease, as of the pelvic region, and of the rhino-pharynx. Special attention was directed to recurring and malignant uveitis terminating in secondary glaucoma and cataract; to acute uveitis beginning as sclero-choroiditis, especially in young subjects, and terminating in myopia and posterior cataract; to chronic uveitis of mild type in elderly subjects, associated with hæmorrhages into the vitreous either as an antecedent or a subsequent condition; and to relapsing plastic uveitis, with special reference to its insidious onset in gouty and rheumatic subjects.

Uveitis.—H. Woods (Baltimore) presented an analysis of thirty-seven cases. From the standpoint of visual symptoms he called attention to the sudden and sometimes complete loss of sight, with plaque-like greyish-white choroidal exudates, and clouding of vitreous; to the possible preservation of useful sight with localised disturbance, metamorphopsia, photopsia, scotomata, &c.; and to dim areas in the field. These, later, were brought out by perimetric examination. They were associated with characteristic choroidal lesions in other parts of the fundus, and later such lesions appeared corresponding to the dim field areas. He called attention to the small number showing evidences of syphilis, rheumatism, scrofula, or tuberculosis. Traumatism, intestinal or menstrual disorders, acute systemic infection, and sympathetic ophthalmia were important causes.

Keratitis Punctata.—H. Friedenwald (Baltimore) discussed the diagnostic significance of this condition. It was not properly a corneal disease, but a deposit due to lesions of the uveal tract. It was found in iritis of all forms, and was characteristic of certain varieties of choroiditis.

Injuries producing Uveal Disease. — H. F. Hansell (Philadelphia) found that the great majority of traumatisms to which the eye is subjected are liable to produce disease of the uveal tract, the character and intensity of which will depend upon the nature of the injury, as well as on the constitution of the patient.

Pathology of Uveitis.—W. H. Wilder (Chicago) called attention to the liability of all parts of the uveal tract to become involved in inflammation affecting any one of them. Inflammations of the choroid may be grouped as purulent, plastic, or serous. In both chorio-retinitis and central choroiditis there may be degenerative changes in the vitreous that sometimes precede the choroidal lesion. With senile central choroiditis may be associated iritis and cyclitis of a serous type.

Pilocarpin Injections in Uveal Disease. — T. A. Woodruff (Chicago) urged that none of the more recent remedies give as good results in selected cases as the judicious use of pilocarpin by hypodermic injection, in doses of one-eighth to one-fourth grain, used in conjunction with the internal administration of potassium iodide. He emphasised the great value of these remedies in certain deep lesions of the eye.

Detachment of the Retina.—R. L. Randolph (Baltimore) reported three cases treated by sub-conjunctival injections of salt solutions. The treatment had not been harmful, but it had failed to produce any marked benefit.

Disappearance of Lens Opacities.—W. L. Pyle (Philadelphia) discussed the cases in which this occurred, the stationary immature cataracts, and the slender basis these afforded for the non-operative treatment.

Ocular Muscles and Orbit.—J. E. Colburn (Chicago) reported a study of the anatomy of the parts immediately involved in strabismus, based upon the examination of 200 cases.

E. C. Ellett (Memphis) reviewed the physiology of the ocular muscles, and urged the need of a definite accepted nomenclature of the ocular movements. He claimed that rotation about the antero-posterior axis never occurs with the normal eye, and suggested a table of movements of the eye.

Treatment of Heterophoria.—E. J. Gardiner (Chicago) thought that before proceeding to operative interference errors of refraction should be corrected, repeated tests should be made of the muscular balance, and treatment by exercises and electricity tried. From the data thus obtained conclusions could be drawn as to the form of operation. Operations should be performed under local anæsthesia, and under conditions permitting the testing of the results obtained from step to step.

S. C. Ayres (Cincinnati) discussed the non-operative treatment of heterophoria. He called attention to the frequent occurrence of such defects in boys and girls who were not well developed. Much could be accomplished by the correction of ametropia, the judicious use of prisms, and freeing the patients from the restraints and exactions of school life.

Treatment of Strabismus.—Edward Jackson (Denver) discussed the principles that should control operative interference. The delicacy of the adjustment required rendered it impossible of attainment by operation alone. Operations do not cure strabismus, but can lessen its amount so that it may pass unnoticed, or be overcome entirely by other measures. The problem of strabismus is one of neuro-muscular dynamics. The first question regarding operative interference is, how will it influence the innervation of the muscles that act upon the eyeball? Operations to alter innervations may be done early, tentatively, with care to avoid excessive effect. Operations that will not alter innervations will be done late, and should aim at more accurate correction. Most operations have aimed at setting forward or back the insertion of a muscle. Lateral displacement of insertions of other muscles may be equally effective, and safer. The function of a particular muscle is not to effect a single movement of the eyeball, but to take an appropriate part in every movement. Every operation should be planned with reference to the secondary, as well as the primary, action of the muscles which it is designed to affect.

G. M. Gould (Philadelphia) disbelieved in operative treatment of strabismus, because: (1) All strabismus is preceded by a stage of heterophoria, and heterophoria is either (*a*) curable by non-operative means, or (*b*) all symptoms are thus relieved, and (*c*) operation alone will not cure or relieve. (2) All permanent or incurable strabismus is preceded by a stage of acute, intermittent, or mixed strabismus and heterophoria, during which cure and relief are possible by non-operative methods. The treatment advised was prophylaxis by public education; the treatment of ametropia, the treatment of heterophoria, the treatment of amblyopia by methods described, and the treatment of physiologically curable strabismus by means of a combination of the preceding methods.

Daviel's Operation for Cataract.—A. A. Hubbell (Buffalo) delivered an address on Jacques Daviel, and the Beginnings of the Modern Operation of Cataract, commemorating the 150th anniversary of the publication of the first description of the operation.

Decentering of Lenses.—G. C. Savage (Nashville) discussed the centering of lenses for near work. In the absence of any muscle error, lenses for presbyopia should be accurately centered. With heterophoria the convex lens should be decentered in the direction that the base of a prism should be turned to give relief for the relatively weaker muscles.

Several other papers were also read.

FRENCH OPHTHALMOLOGICAL SOCIETY.

(*Continued from page* 232.)

Glaucoma.—Zimmermann looks upon glaucoma as the expression of a difference between the vascular pressure and the intraocular tension. Under the influence of a mental or physical shock the blood pressure may readily be lowered suddenly, while the tension in the eye remains the same. The blood will then have great difficulty in entering the globe, and an arterial pulsation will be visible ; the result of this difficulty in the circulation is defective nutrition and œdema, which has the effect of increasing the actual intraocular tension. The effect of this, again, is to distend the sclera and to compress the intraocular veins, even in certain cases to obliterate them ; œdema of the ciliary body, iris, and choroid is thus brought about. It is after that that the obvious conditions of increase of tension, swelling of the ciliary processes, flattening of the iris against the cornea, and closure of the angle of the anterior chamber, all take their rise. It is in this way that the two rival theories of defective excretion and increased secretion fit into one another. In point of fact, the intraocular tension may never rise above normal, and yet be too high relatively to the arterial pressure ; for example, in fatty degeneration of the myocardium and in various other heart diseases, congenital or acquired ; whenever, indeed, the arterial tension is reduced by any persisting and efficient cause. In this way the "glaucoma" cupping may develop without any rise of tension, and Zimmermann goes so far as to suggest that even the physiological cup may take its origin in the same manner. The influence of the truth of this theory upon treatment is at once manifest ; the preliminary attacks of transitory glaucoma are no longer to be regarded as signs of disease of the eye ; the eye is quite healthy, but is injuriously affected by the lowering of the arterial tension. It is only after such prodromal attacks have gradually brought about anatomical changes at the angle of the anterior chamber, disc, &c., that glaucoma becomes a disease of the eye. These remarks, of course, do not apply to secondary glaucoma produced by exclusion of the pupil, by atropin, by discission of the lens, &c. ; in that condition there is a definite increase of the intraocular tension as a first step in the process, while the arterial tension is unaltered. Primary glaucoma, then, one ought to treat not, as heretofore, by reduction of the intraocular tension by means of myotics and iridectomy, but by endeavouring to raise the intravascular pressure. Zimmermann has accordingly experimented with various cardiotonics ; digitalis is unsuitable because it causes a certain dilatation of the pupil, but strophanthus has proved very satisfactory indeed, for it acts on the heart alone and not on the vessels ; the dose used was 8 minims four times a day. Adonis vernalis has acted, if possible, even better : out of forty cases of subacute glaucoma treated in this manner he has only found it necessary to perform iridectomy once.

Tattooing preferable to Enucleation.—M. de Wecker holds that a great many times enucleation of a stump is performed quite unnecessarily, and that tattooing accompanied by tenotomy of all four recti would give much more satisfactory results. The free tenotomy prevents, to a large extent, the distortion of the globe, and makes the stump appear larger.

Treatment of Diplopia.—M. Terrien relieves his patients who suffer from diplopia as the result of paralysis of certain of the ocular muscles, by causing them to wear glasses, the outer half of each of which is rendered opaque ; the patient thus, on looking to either side, has one image blotted out, and is spared the inconvenience arising from double vision.

Extirpation of Lachrymal Sac.—M. Valude believes that certain surgeons have not been pleased with their results from this operation on account of faulty technique. The first incision, in his opinion, following the rule of Voelckers and Kuhnt, should begin quite above the palpebral ligament and follow the line of the orbital wall, that is to say, forming a gentle curve. To begin below the ligament is a mistake ; the incision should at once go down to bone. Free hæmorrhage immediately occurs of course, but he has never had any difficulty in checking this with forceps ; it is quite unnecessary to complicate the operation by placing the incision otherwise, in order to avoid the angular artery. He finds it a great advantage to fill the sac first of all with paraffin.[1] It is best to dissect the sac from the neighbouring tissues from the inner side outwards, then at the outer side, then above, and last of all below. He introduces a small stick of iodoform into the open upper end of the nasal duct,[2] and sews up the wound without drainage, which is then dressed, a firm pad being pressed upon the parts at the angle that no collection of blood may occur. He greatly prefers general to local anæsthesia in the treatment of these cases.

Optic Neuritis following Measles.—M. Fage (Amiens) related a case of this rare occurrence, which took place in a little girl, aged 3, resulting unfortunately in complete loss of sight.

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[1] The present writer, as the result of his experience, would rather recommend stuffing with iodoform worsted.

[2] A still better plan is just to touch lightly the open mouth of the nasal duct with the cautery ; this closes it permanently and prevents any risk of infection of the wound.—Ed.

TWO CASES OF INDIRECT GUNSHOT INJURY OF THE EYE.

By M. Thomas Yarr, Major R.A.M.C., Aldershot.

The following are the brief notes of two cases of indirect contusion injury of the eye. They belong to a class of injuries to which attention has been comparatively recently directed—injuries interesting not only *per se*, but also from a medico-legal point of view. In both cases there was no external evidence of eye injury; yet in one vision was wholly, in the other partly, destroyed, the loss of sight being due to curious lesions of the fundus, the pathogeny of which seems somewhat obscure.

Case I.—Private K., Northumberland Fusiliers, aged 25, was admitted to the Cambridge Hospital, Aldershot (Ophthalmic Department), on May 23, 1902, having been invalided from the front owing to loss of sight in the left eye following a bullet wound of the face. He presented a tiny scar half an inch below the external palpebral angle of the left eye, and another larger puckered scar one inch below and half an inch in front of the external palpebral angle of the right eye: the former being the wound of entrance, the latter that of exit. The eyes themselves looked quite normal, save that the pupil of the left was semi-dilated; their mobility was unimpaired. Vision: Right eye $\frac{6}{24}$, not improved; left, *nil*, except slight perception of light on throwing a beam of light upwards and inwards. The lower margin of the left orbit was very slightly "rucked up," but the direction of the bullet-track across the face showed clearly that the orbit had not been penetrated. The right eye presented no abnormality whatever on a careful ophthalmoscopic examination. In the left, however, important fundus changes were found. The disc appeared normal except in its lower fourth, where there was a pale and slightly depressed area. Just below it, and separated from it by a narrow band of apparently normal retina, was a large wedge-shaped white area extending downwards as far as the eye could trace it, with radiating processes, one of which passed upwards and outwards across the macular region. The surface of this white area had an indescribable *woolly* appearance, and was very slightly raised (about 3 D.); the tortuous retinal vessels ran down over it for a short distance and then abruptly disappeared beneath the fleecy surface. On the portion of the patch near the disc were two large hæmorrhages, while several smaller ones, and a good deal of pigment disturbance, were visible in the surrounding retina, except in its upper and inner part, which seemed normal.

The patient gave the following history. He had never seen well with the right eye, and for this reason learned to shoot from the left shoulder. He considered the vision of the right eye after the injury to be at least as good as ever it was—in fact, he was inclined to think it had improved slightly since that of the left was destroyed. He received the wound when in action at Klerksdorp in the Western Transvaal, on February 25, 1902; the bullet, a Mauser, was fired at very short range, some fifty yards. He lost consciousness immediately after the receipt of the injury and remained senseless thirty-six hours. On recovering consciousness he found his face and eyes enveloped in bandages and dressings. When these were removed some days later he did not notice any defect of vision, and knew nothing of the loss of sight till his medical attendant tested him with types a month after he was wounded; he was then found to be blind in the left eye.

The patient was discharged from the Cambridge Hospital, Aldershot, as an invalid on June 5. He came to see me in

July, mainly to tell me he was convinced that the sight of his right (amblyopic) eye was improving. I found the left eye unchanged; he could read $\frac{6}{18}$ with a little difficulty with the right. (I exhibited this patient as a "card case" at a recent meeting of the Ophthalmological Society.)

CASE II. — Corporal G., Wiltshire Regiment, was invalided home from the front at the same time as the previous patient, and admitted to the ophthalmic department in the Cambridge Hospital, Aldershot, on the same date—May 23—of the present year. He had slight left ptosis, and complained of defective vision in the left eye. He stated that in August, 1901, he and some comrades were making a fire with some sticks on the veldt, when a Lee-Metford cartridge which had fallen into the fire exploded and struck him violently on the left eye-brow. Considerable swelling of the eye-brow and upper lid followed, but he did not think much of the matter at the time, as his regiment was "trekking," and keeping up a running fight for several days afterwards. About three weeks after the injury he consulted the medical officer of the column, partly on account of the persistent drooping of the lid, but chiefly because the sight of the eye had become bad. This gentleman wished to send him to the nearest military hospital, but he did not like to leave his regiment and, as a matter of fact, did not do so till seven months later, when, as there seemed to be no more fighting for his column, he bethought him that his eye was no better, "reported sick" at Pretoria, was admitted to hospital there, and finally invalided to England.

On admission to the Cambridge Hospital, Aldershot, his condition was as follows: Right eye normal, vision $= \frac{6}{6}$. Left, slight ptosis, vision $= \frac{6}{36}$ and J. 8; field of vision considerably contracted above; slight pigment disturbance in the macular region, not very noticeable in itself, but easily made out on comparing with the right macula; several small, ill-defined, dirty-white patches, evidently choroidal, close to the disc along the inferior temporal vessels. I satisfied myself completely that the patient's $\frac{6}{36}$ was genuine: he was quite sure that the vision in the eye had been excellent prior to the injury.

He was discharged from hospital as an invalid on June 12, and I have not seen him since.

Practically, the only point common to the two cases is the fact that both were due to concussion or vibration from some distance, the original missile—in one case a bullet, in the other a cartridge—having in neither case touched the eye. This class of eye-lesion is of much interest to Army medical officers, in view of the fact that the injuries are generally received in action, so that questions of compensation or pension are involved; while even in civil life it is quite conceivable that cases might occur in which nice medico-legal points could be raised.

Mr. Nettleship was the first to bring these indirect gunshot injuries prominently into notice in this country. His exhaustive paper on "Blindness from Gunshot Injury of the Orbit,"[1] not only cited six cases of his own, but contained references to the few previously recorded cases. An interesting discussion followed the reading of this paper before the Ophthalmological Society, in which Messrs. Hartridge, Gruber, Donald Gunn, Tatham Thompson and Treacher Collins gave their experiences of similar cases. In none of these instances, however, did the missile strike, or pass through, the orbit so far away from the eye as in mine; in fact, in most of them there was evidence that the eye was actually touched, though not ruptured or cut. Mr. Nettleship's cases are described specifically by him as being instances of injuries "in which the passage of a bullet *through* some part of the orbit is followed immediately by free bleeding into the vitreous, and as this clears up, by various and mixed appearances of choroidal rupture, chorio-retinal exudation, and changes at the disc"

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[1] *Transactions of the Ophthalmological Society*, 1901, vol. xxi.

(the italics are mine). The only rational explanation of the cause of the lesions is that concussions or vibrations are transmitted through the tissues to the eye-ball, where, sparing the sclerotic, they produce gross changes in the more delicate choroid and retina. In my first case, which may be taken as typical of those more serious injuries due to very powerful concussion, the lesions found appeared to be due partly to a kind of retinitis proliferans following effusion of blood into the vitreous, partly to adhesive inflammation matting together the sclerotic, choroid and retina, with perhaps some atrophic changes in the lower part of the optic nerve. In other instances, as in my second patient, the concussion is less violent and produces simple disturbance of pigment, with perhaps tiny patches of choroidal atrophy, changes which would be of comparatively little importance were it not for their predilection for the macular region.

A HISTOLOGICAL STUDY OF THE CRYSTALLINE LENSES OF A HANGED CRIMINAL.[1]

BY CHARLES A. OLIVER, A.M., M.D.
PHILADELPHIA, U.S.A.

THROUGH the kindness of Dr. Jay C. Knipe of this city, one of my assistants and friends, I was put in possession of the two eyeballs of a recently-hanged forty-year-old negro. A systematic study of the lenses was made, notes of the most minute change found in each section being taken.

The portions of the studies considered in this communication may be summarised as follows :[2]—

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[1] Read before the American Ophthalmological Society in July, 1902.

[2] The writer is under deep obligations to Dr. Harold G. Goldberg, Pathologist and Curator to Wills' Hospital, Philadelphia, for his painstaking preparation of the specimens which have rendered these studies possible.

The eyeballs failed to show the slightest anomaly. The lenses were normal for their age, and their weights were those that are given for the non-cataractous types at the subject's period of life ; they were not tumescent ; there was no evidence of any radially arranged thickenings or opacities ; and none of the normal dark interspaces were filled with tissue-fluid. There were not any capsular folds.

In the capsules and subjacent lens-elements of the equatorial regions between the anterior and the posterior insertions of the zonule of Zinn, situated somewhat more posteriorly and to the right sides respectively, there were a number of linearly arranged zigzag-like breaks with extruding margins. These breaks were accompanied by a series of short, irregular and feathery-like offshoots. The more central portions of both of the anterior and the posterior capsules, with the underlying lens-matter, exhibited shorter and more minute cracks and splits similar to those seen on freshly-broken surfaces of newly-formed ice—mere solutions in continuity.

Fresh tears in the anterior fibres of the zonules, corresponding in position with the main equatorial breaks, and without any signs of inflammatory bands or other products, were manifest. The suspensory ligaments were torn in several situations, but not to sufficient degree to give rise to coarse dislocation of the lenses, as has been seen macroscopically in some previous instances.[1]

A few striated and plaque-like areas of deposit on the lenticular surface of the anterior capsule of the left lens, were, after most careful staining processes, shown to be in slight evidence, though there were not any coarse hyperplasias of the capsular epithelium ; these hyaline excrescences, exhibiting the very beginning of localised capsular opacities, were, however, no more pronounced than the writer has seen in other clear lenses of the same age of life. There was not a single daughter cell of vesicular type of parentage.

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[1] See records of such cases by Dyer and Green, in the *Transactions of the American Ophthalmological Society.*

Abnormally placed epithelial cells in other situations were unsuccessfully searched for, particularly those hyperplasias which would prove the existence of new cellular formation among the extremely delicate and most readily irritated so-called formative cells in the equatorial regions. Dislocated and fissioned nuclei, for which particular search was made along the borders of both the anterior and the posterior capsules, were not found. The connections between the whorls, the capsules, and the delicate and newly-formed fibres did not exhibit the slightest trace of undue separation. The capsules were not thickened, and did not indicate any hyperplasias in the regions of the wounds. The breaks did not show the usual free spindle-cell infiltration, and there were not any pigment granules. In other words, with the exception of the fresh capsular and underlying lenticular breaks, there were not any changes that could be considered abnormal for the age of the subject.

There were some hæmorrhages from a few minute traumatisms in the contiguous tissues of the ciliary body. No other extravasation of sanguineous fluid could be detected.

Apart from these changes the globular contents were intact.

It was not deemed necessary to study the chemistry of the nuclei of the lenses, as the lenses had not undergone shrinkage, and hence it was doubtful whether there could be any chemical change indicative of future senile sclerosis. As far as could be ascertained, there did not seem to be any hereditary predisposition to the formation of cataract.

Remarks.—As to the lenses themselves, lenticular retrogression may be said to begin as early as the third period of fœtal life, when the youngest fibres crowd the older ones towards the lens centre, and expose them to changes which result in the formation of nucleus and cortex. Moreover, the superficial layers of lenses microscopically assume a faint gloss-like appearance as early as the twentieth year, which proportionately increases as age advances, causing the nuclear areas, one or two decades later, to become apparent as deeply seated yellowish bodies. In the meanwhile, the stellate arrangements of the lens fibres become more pronounced, and the equatorial borders appear as pale golden rings, from which fine and superficially situated radii—possibly thickenings along the insertions of the zonule of Zinn—may be noticed.

The thin fibrinous plugs of regeneration situated at the sites of recent injuries to lenses could not be recognised. Degenerated lens fibres and epithelial nuclei with surrounding leucocytoses, forming the first signs of regenerative processes, could not be found. No signs of cicatricial tissue, although systematically searched for at the original points of the breakage areas, could be determined.[1]

In this case there was a traumatic solution of the continuity of the capsules of so rapid a type, and one that was practically provoked at the time of general dissolution, that there was not time to disturb the nutrition of the lens. There was no opportunity offered for chemical changes to take place in any stagnated intercellular fluids, let alone the appearance of secondary cloudings of the lens fibres; there was not any chance given for the surrounding intraocular lymph streams to act upon the exposed lenticular fibres.

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[1] This in spite of the fact that it was well understood that any hyperplasia of the capsular epithelium may remain primarily transparent for at least seventy-two hours.

It is probable that the incomplete dislocation of the lenses was due to partial breakages—true tears—of circumscribed areas of the zonule of Zinn. The capsular cracks and the subjacent lenticular ruptures were dependent upon breaks in the weakest portions of the capsule and lens.[1]

The probable mechanism was, that the greater specific gravity of the lenses and the capsules held in their liquid chambers by networks of delicate fibrillæ which probably exercised relatively equal amounts of pressure upon the contained capsules and lenticular bodies, allowed a partial tearing away of these structures from their zonular attachments, the moment that the impact of the body against the rope took place—the tense elastic lens and capsular fibres suddenly spreading, and breaking at their most vulnerable and most greatly disturbed parts.

The causative factors for the production of the ciliary hæmorrhages can be understood from the same standpoints.

The few indifferent hyperplasias of the epithelial cells were the probable results of age and use ; true consecutive conditions that are so often seen in the so-called normal lenses of such periods of life.

The splits, the zonular ruptures, and the hæmorrhages most certainly took place during life ; the other lens-changes were undoubtedly not of *post-mortem* type.

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[1] This can be understood when it is considered that in a subject of the age of this individual, the zonular fibres are somewhat stiffened and brittle, and the capsular and subcapsular tissues are relatively hardened and unyielding ; such structures, subjected to the sudden action of a gross direct force or an indirect violence as in this case, in which there was a quick concussion of the entire body, must necessarily give rise to the above-noted conditions.

REVIEWS.

ADOLF H. PAGENSTECHER (Heidelberg). Tumours of the Optic Nerve. *v. Graefe's Archiv für Ophthalmologie, liv.*, 2.

This paper contains a detailed account of three tumours of the optic nerve which have come into the author's hands for examination.

The first case is in several respects a remarkable one. A healthy-looking woman, aged 30, first came under the care of Dr. Steffan, of Frankfort, in June, 1873, with beginning papillitis of the left eye. This gradually increased, in spite of all treatment, until at the beginning of October the papilla was unrecognisable except as a diffuse white patch, and vision was abolished. Soon after followed iritis, hyalitis, and secondary glaucoma. The diagnosis was difficult; the case was obviously of too severe a character for a simple retrobulbar neuritis, yet the absence of proptosis or of restriction of mobility of the globe made a new growth doubtful. But as the latter supposition seemed the most probable, it was decided to remove the eye with as much of the optic nerve as possible. When this was done, the cut end (about 1 cm. from the eye) showed a diameter of double the normal size, the nerve being surrounded by a homogeneous-looking mass of new growth. All was enclosed within the dural sheath, from which the outer surface of the growth was sharply defined, while on the other hand it seemed to merge with the pial covering of the nerve. Microscopically it consisted of closely-woven bundles of finely fibrillar substance with some round and spindle cells; it was "a primary fibro-sarcoma of the optic nerve." Although the removal had been incomplete the socket healed perfectly well.

It was not until *twenty-five years later*, in June, 1899, that the patient came under the care of Prof. Leber on account of swelling of the orbit and consequent inability to wear her artificial eye. On examination some fulness was evident beneath the lower part of the conjunctiva sac, but this was of no great magnitude, and the movements of the stump were still good. It was therefore somewhat of a surprise to find on exenteration that the deeper parts of the orbit were entirely filled by new growth, which extended at its apex into the optic foramen. As much as possible was removed, together with the periosteum of the orbit, and the cautery was applied to the tissue in the optic foramen. The growth removed was as large as a good-sized walnut.

Next day symptoms of acute meningitis set in, and on the second day the patient died. At the necropsy severe purulent meningitis of the base was found, though it was curious to note that no trace of suppuration had occurred in the orbit. A knob of growth as big as a hazel nut had developed inside the cranium.

Microscopic examination of the tumour showed it to consist in large proportion of connective tissue trabeculæ, the spaces between which were filled by masses of nucleated cells. Similar masses of cells lay between the bundles of the optic nerves. The type to which the cells belonged was indicated by the fact that in many places they formed "nests" by the aggregation of concentric layers of flattened cells. The growth therefore belonged to the sub-group of the sarcomata known as endothelioma.

It happened by a coincidence that Pagenstecher had just finished the examination of this case when, in going over some old preparations, he came across the specimen of the original tumour removed by Dr. Steffan. Re-examining it, he was able to discover in it indications of a tendency to concentric arrangement of the tumour cells, thus obtaining interesting proof of the continuity of the growth through the long interval of time.

For the second case the author was indebted to Dr. Swanzy, of Dublin, who sent the tumour to Professor Leber. It was taken from a girl aged 15, in whom protrusion of the left eye had been noticed for six years. When first seen, in October, 1900, the proptosis amounted to 2·5 cm.; the eye was movable, though to a limited extent, in all directions; ophthalmoscopically, there was optic atrophy, with enlarged retinal veins, and vision was *nil*. The growth was removed without ablation of the globe, by cutting the external rectus tendon close to its insertion and rotating the eye inwards; the nerve was then cut through close behind the globe, and again as far back as possible, but the section here passed through tumour tissue as well as nerve.

The tumour was of pyramidal form with its smaller end towards the eye, it was 3 cm. long by 2 cm. wide at its thickest end. It was everywhere enclosed in the dural sheath of the nerve.

On microscopic section it presented a pretty uniform structure; everywhere there were round or oval nuclei, with an intervening substance of a striated texture, the striation tending to run parallel with the optic nerve; where the striæ were most distinct the nuclei were generally of the oval form. A distinction into two parts was traceable through the greater part of the growth, the one being apparently older than the other, as it contained numerous granules and masses of calcified material, which was present only to a very slight extent in the latter. These calcified masses appeared to be a deposit between the cellular elements and not a degeneration of the cells themselves, and probably represented a transformation of mucin. Many of the vessels also showed more or less complete calcification of their walls. In teased preparations many of the cells had an appearance suggestive of glioma; other characters pointed to myxoma: on the whole the author declined to give a definite name to the growth.

In the third case the growth was of more rapid development than in either of the others, the exophthalmos attaining a marked degree within seven weeks: the patient also was younger, a boy aged 5. Besides the proptosis there was papillitis and loss of vision, but the movements of the globe were unrestricted.

Five months after the first indication of the malady the removal of the growth was undertaken by means of Krönlein's osteoplastic resection of the orbital wall. The tumour was easily reached, the nerve was severed close to the globe, but the growth was found to extend with the nerve through the optic foramen, so that its complete extirpation was impossible. The wound, however, healed well, and when the patient was last seen, five months after the operation, there was no apparent increase in the prominence of the globe. Slight motility was then present in the superior and inferior recti and the lid could be raised; slight corneal changes had occurred, and there was widespread retinal degeneration.

Where the tumour was cut through at the operation it was 17 mm. in diameter. Outside was the dural sheath, stretched but intact; nearly in the middle was the optic nerve. In the tumour mass, which thus filled the much distended intervaginal space, could be distinguished stroma and parenchyma in nearly equal proportions. The stroma consisted of stout fibrous trabeculæ; these were connected only loosely with the dural sheath, but evidently had their origin in the fibrous trabeculæ of the pin, into which they passed directly and continuously. They might thus be regarded as a hyperplasia of the arachnoid stroma, while the cells contained in their meshes might be looked upon as a development of their covering endothelium. The trabeculæ in some places were close together and covered only by a single more or less continuous layer of flattened cells; in others, the spaces between them were much larger and were filled by masses of somewhat closely aggregated cells. Here and there were decided spaces containing mucin. The optic nerve was considerably increased in diameter, the increase being due partly to irregular thickening of the processes of pia separating its bundles, partly to cells lying within and along these thickened trabeculæ and along the nerve bundles, which were not to be distinguished by their characters from the tumour cells outside the nerve. Partly, also, was the thickening due to a distinct increase of the neuroglia cells of the nerve bundles themselves; and this increase was so marked that the author hesitates to attribute it entirely to the effect of the irritation of the new growth on the glia cells. He admits, however, that the difficulties in the way of regarding the new growth as primarily a glioma would be greater still.

Pending further researches, the author is inclined to regard as the type of the optic nerve tumours an endothelioma having its starting point in the pial covering of the nerve. W. G. L.

BELLENCONTRE. Iodipine and Lipiodol. *La Clinique Ophtalmologique*, *July* 25, 1902.

Iodised oil is not a mere solution of iodine in oil, but an actual stable combination of the iodine with the fatty acids, and though it possesses all the therapeutic qualities of iodine it is free from its inconveniences ; for it has neither the colour, the odour, the toxicity, nor the caustic power of iodine. It is, on the contrary, a colourless substance with a faintly oily smell and taste, causing no discomfort, either to the digestive tract if taken internally, or to the tissues if applied locally. Even in large doses it can be administered as a hypodermic injection without pain, without danger, and without iodism. It is to be met with in two forms, known respectively as iodipine and lipiodol, which, however, differ chiefly in this, that the former has a concentration of from 10 to 25 per cent., while the latter has about 40 per cent. concentration. Bellencontre has found it most suitable to employ the weaker solution (iodipine, 10 per cent.) as a local application, and the stronger (iodipine, 25 per cent., and lipiodol) internally.

Even in large doses internally iodised oil does not cause any of the disagreeable upset which iodide of potassium is apt to do ; on the contrary, the patients become stouter and their appetite improves ; only rarely do symptoms of iodism occur and the patients begin to complain. Its absorption is rapid ; iodine may be found in the urine twenty minutes after ingestion ; but with all that elimination is slower than with the iodides, the iodine appears to be stored in the tissues, which is probably the reason for the absence of iodism. Iodine may be found in the urine a month or even longer after administration has ceased. The oil is not unpleasant even alone, and can be made into a quite agreeable emulsion. Hypodermic injection is, however, unquestionably the best method of administration; it is painless, and causes no local reaction; the syringe must not be made with any vulcanite or rubber. It is in tertiary syphilis more especially that these preparations are of peculiar value, and in parasyphilitic conditions, but also in the lymphatic diathesis, in rheumatism and scrofula; they have also been instilled into the eye and injected subconjunctivally. In interstitial keratitis Bellencontre found the iodised oil given hypodermically to be of much value. Scrofulous children subjected to this treatment on account of "strumous keratitis," instead of "falling off" as they are apt to do when given iodides, rapidly put on flesh, and in a number of instances various strumous manifestations vanished without any local treatment being employed. In the ordinary iritis of secondary syphilis iodised oil is not indicated, but in those which are of rheumatic, of tubercular, or of doubtfully syphilitic origin (later than secondary), and in those of any etiology in which the affection attacks Descemet's membrane and the cornea, iodised oil is a very valuable agent indeed. In such conditions as tabes, optic atrophy without tabes, ophthalmoplegia, &c., on the other hand, Bellencontre has not been able to obtain benefit for his patients to anything like the same extent, nor is his record with the subconjunctival use of the drug such as to encourage the present writer to employ it.

W. G. S.

L. DEMICHERI (Monte Video). Traumatic Paralysis of both Superior Oblique Muscles. *Annales d'Oculistique, October*, 1902.

Demicheri (Monte Video) describes the case of a girl, aged 21, of good health and family history, nervous, but not in any way hysterical. Four months previously she was brought unconscious into hospital, having fallen, as her relatives believed, from an upper storey. Her wrist and upper jaw were fractured, and there was a slight contusion of the left upper eyelid, but there were none of the classical signs of fracture of the base. She remained unconscious for three days, after which she recovered, and presently complained of double vision. On examination the eyes as regards other matters were found to be quite normal, but presented the following abnormalities in movement: On attempting to look straight downwards the eyes also converged; on looking downwards and to the right the left eye remained higher than the right, and conversely on looking downwards and to the left. She complained of much difficulty in walking on account of the double vision; descending a stair was particularly difficult. On lowering the candle or other fixation object directly in the middle position, the image of the right eye descended more quickly than that of the left. When the candle was placed to the left and below, the (homonymous) image of the right eye was always lower than that of the left and showed no tilting, while the image seen by the left eye had its upper end inclined to the other. On placing the candle to the right and below, the image of the left eye, which had been the higher at first, descended and appeared to stand closer to the patient. The inclination exhibited by the images was very interesting; when the candle was to the left and below, the left image was much tilted, but became more erect as the candle was carried nearer to the middle line. It was only in the extreme right (and lower) position that the right image showed any decided inclination towards the other at its upper part; but the patient was not always consistent in her statements as regards that portion of the field at different *séances*. Under ordinary conditions it seemed to the patient sometimes that the right image was inclined, sometimes that the left was, and sometimes that both were tilted. The fact of the torsion of the left image being obvious over a much larger area than was the torsion of the right—extending even across the middle line—Demicheri attributed to the fact that the patient used the image of the right eye as her standard of erectness, regarding it as truly vertical, that of the other being, by consequence, regarded as inclined; and the reason of the selection of the right eye as the supposed correct one he believed to be the fact of the existence of the contusion and consequent swelling of the left upper eyelid at the beginning of her symptoms, for one eye had equally good vision with the other.

As regards the situation of the lesion, it is important to observe that though the patient had had a severe fall she had had no symptoms whatever pointing to a fracture of the base of the skull, so that, apart from the intrinsic unlikelihood of such a double localised lesion, any idea of an orbital situation for the damage seems almost excluded. Other possible situations for the lesion were at the level of the cavernous sinus, or at the base of the skull itself, either by the nerve being implicated in the fracture itself, or by compression or other involvement in pachymeningitis, neuritis, or hæmorrhage, and lastly in the course of the fibres through the cerebral substance, and at the nuclei. It is difficult, however, to see how the damage could occur from a lesion of the cavernous sinus without some other signs of this. At the base of the brain the three motor nerves of each eye approach one another in the region at which the sella turcica and petrous portion join, and pass through the dura almost together, close by the outer wall of the cavernous sinus. A lesion at this situation might cause injury to or separation of the processes of dura which are attached to the clinoid processes, and which assist in maintaining the integrity of the tentorium cerebelli. Lesion of the base then are much more liable to implicate the sixth nerves, and even the fifth and the third, rather than the fourth, which is extremely rarely injured in such cases. Practically speaking, therefore, a bilateral injury to the fourth nerves at the base may be left out of consideration.

It is not certain, however, but that the lesion might lie in the cerebral tissue, particularly as certain experiments on dogs, carried out by Duret, appeared to show liability to hæmorrhage occurring in the neighbourhood of the fourth ventricle, especially when the traumatism was applied to the frontal area.

Wilbrand and Sänger expressed a strong opinion that in the absence of signs of a large cerebral hæmorrhage, one may be almost certain that a bilateral paralysis of nerves occurring simultaneously has its seat in the nuclei: certainly at no other part of their course are the two so closely approximated. But in the case of the two fourth nerves it must be recollected that these interlace at their exit from the cerebrum at the valve of Vieussens. A hæmorrhage then at this situation, occasioned, as Duret in his experiments found to be the case, by the passage of a wave of cerebrospinal fluid, would then readily enough cause a bilateral damage to the fourth nerves. The nuclei of these two, again, are so decidedly merely a portion of those of the third nerves that a lesion of the nuclei, to explain the conditions present, must be very precisely limited.

Demicheri believes that his case, thus reported, is unique in the literature of the subject.

W. G. S.

F. TERRIEN AND J. CAMUS. The Effect of Stimulation of the Cervical Sympathetic upon the Refraction of the Eye. *Archives d'Ophtalmologie, June*, 1902.

In this short paper, which was read before the *Société de Biologie*, the authors record the results of experiments performed on rabbits, dogs, cats and monkeys. The determination of the refraction was arrived at by means of the shadow test.

Description of one experiment will suffice; the following is the second in the ten given by the writers. Section of the cervical sympathetic on the right side (rabbit); this was followed by the usual signs,—contraction of the pupil, dilatation of the capillaries of the ear, &c. The refraction, after section, was + 4 dioptres in the horizontal, + 3 dioptres in the vertical meridian. On excitation of the nerve by a weak continuous current, the refraction became + 2 dioptres in the horizontal, and + 1 dioptre in the vertical meridian. Dilatation of the pupil also occurred, but the two phenomena were not synchronous; the pupil dilated quickly, the change in the refraction appeared later, but passed off more rapidly when the stimulation of the nerve was stopped. These experiments led the authors to conclude:—

(1) That stimulation of the cervical sympathetic, after section, induces *in all cases* an increase in the refraction of the eye on the same side. The increase is small, varying 1 D. to 2·5 D.

(2) That this change in the refraction does not coincide exactly with the dilatation of the pupil. It begins rather later and its duration is shorter.

The authors are uncertain as to the explanation of the phenomena they have observed. They found that section of all the circum-ocular muscles (in two of their experiments) had no effect on the alteration of the refraction, and therefore they dismiss the idea of elongation of the globe, or increase of corneal curvature, by muscular action. Experiments with Purkinje's images, to ascertain if the refraction of the lens changed, gave no definite results, the sharply curved surfaces of the lens in the rabbit and cat making the images very small. A further communication on this subject is promised. J. B. L.

J. STRZEMINSKI (Wilna). The Occurrence of Ocular Syphilis in the Third Generation. *v. Graefe's Archiv für Ophthalmologie*, lii. 2, p. 360.

The question of the occurrence of hereditary syphilis in the second generation has only recently been raised. In the discussion on this subject held at the International Congress in Paris, in 1900, the various observers expressed different opinions.

Generally speaking, hereditary syphilis shows the same appearances in the second generation as in the first. Not only are morbid symptoms present, but general disturbances, such as general atrophy, congenital decrepitude, arrested physical and mental development, aged appearance, are also met with. According to some observers, various congenital malformations may also occur. The decreased vitality renders the organism more vulnerable and more susceptible to such diseases as rickets and tuberculosis. The *post-mortem* examination reveals only a general atrophy of all the tissues and organs.

Ocular affections are very frequent in the hereditary syphilis of the second generation, and various congenital malformations of the eye have been observed.

The diagnosis of hereditary syphilis in the second generation is not easy; the following points have all to be proved to establish the diagnosis: The exclusion of acquired syphilis in the parents of the patient; its presence in one of the grandparents; the occurrence of hereditary syphilis in one parent; and the exclusion of the possibility of infection of the patient with syphilis after birth. Syphilis acquired in early life produces symptoms not unlike those of the hereditary form.

The author gives in detail the history of a case where all these conditions were fulfilled. As a characteristic symptom he mentions particularly the pigmentation of the optic disc. The temporal half was covered all over with small black pigment spots; the nasal half had only a thin ring on its circumference. Round the macula and between the latter and the optic disc, small round circumscribed reddish-yellow spots with pigmented edges were seen—the areolar choroi-retinitis frequently observed in hereditary syphilis.

The author comes to the following conclusions: Abortions and premature births are much rarer in the second generation than in the first. The children do not so frequently die soon after birth with the appearance of general atrophy of all organs and tissues. In other instances the children show various dystrophies, or, though to all appearance look healthy, they begin to waste after some months or years, and remain backward in growth both physically and intellectually. Often these children are attacked by various diseases which generally do not differ from those common in the first generation—most frequently by ocular affections. These are more readily amendable to treatment than in the first generation, and are probably due to an attenuated form of virus. The majority of the children of hereditary syphilitics, however, remain free from the injurious influences of syphilis, as far as can be made out from the present knowledge of the subject. K. G.

VALENTI (Rome). Total Amaurosis from Fungus Poisoning. *Annali di Ottalmologia*, *xxxi.*, 3, 1902.

In Italy large quantities of various fungi are devoured by the people, and especially, owing to the nutritive qualities with which they are credited, and to the fact that they can often be had for the trouble of picking, by the very poor. Usually the peasants are fairly well aware which fungi may be eaten with impunity; but such is not the case with the town-dwellers, who gather them when in the country, sometimes with unfortunate results. As a general rule, the course of symptoms in a case of severe poisoning is a period of excitement, violent agitation, headache, cramps, convulsions, myosis, blue or violet vision, vesical and rectal tenesmus, sweating, subcutaneous hæmorrhages, collapse, and death, either with gastro-intestinal, cardiac, or pulmonary symptoms. The author, however, does not find in the literature of the subject many records of the nervous system being specially affected, and none at all of such symptoms as were presented by the patient whose case is the basis of his paper.

His patient was a man, aged 26, who was at the time and had always been in the enjoyment of good health. On September 17 he ate a number of the fungi, which he supposed to be edible, but which, on description, were identified as belonging to the family *amanita*, of which very many are highly poisonous. The same day he began to suffer from gastro-intestinal distress, with constipation, however, and an inability to micturate. During the following night severe pain came on in the right eye, rendered worse on any effort to move it, and he noticed that when looking at any object with it the central parts of such an object were much less clearly visible than the peripheral. By the 22nd sight had become reduced to perception of light, and shortly thereafter precisely similar symptoms began to be manifested by the left eye: it was then that he came under the care of Valenti. In regard to the eyes, nothing abnormal was to be seen externally, save that the pupils were somewhat dilated; he could barely tell light from darkness. The ophthalmoscope showed anæmia of the discs, without any irregularity of their margins; the narrow arteries contrasted strongly with the better filled veins: otherwise nothing pathological was to be seen in the fundus. He was treated with injections of strychnine, electricity to the eyes—the negative pole being applied to the back of the neck—purgatives, iron, arsenic, and nutritious diet. For eight days no improvement was observable, but after that time the patient stated that the darkness in which he felt himself to be was becoming less dense, and once improvement began it proceeded fairly rapidly. Central vision improved, colour vision began to return, and the aspect of the discs to be more normal. As he had still a little night-blindness (?) the treatment recommended by Trantas, namely, the administration of liver internally, was carried out. The patient eventually recovered with vision, when last examined, equal to $\frac{3}{10}$. The case seems to have been one of acute retrobulbar neuritis caused by fungus intoxication. W. G. S.

ZUR NEDDEN (Bonn). Marginal Ulcers of the Cornea. *v. Graefe's Archiv für Ophthalmologie, liv.*, 1.

Zur Nedden has for a period of twelve months been paying particular attention to the clinical and bacteriological aspects of marginal ulcers of the cornea. He divides these ulcers into two groups:—

(1) Those which are secondary to phlyctenular conjunctivitis and blennorrhœa of the conjunctiva.

(2) Those which are primary and independent of conjunctival inflammation. These, again, fall into two classes:—

(*a*) Originating without known cause—Schmidt-Rimpler's chronic peripheral "furrow," keratitis, and perhaps Fuchs's marginal ulcer, which is associated with a uric acid diathesis.

(*b*) Originating in infection of the cornea by the bacillus which Zur Nedden has isolated, and which he describes in this paper. Two groups of cases come under this category (*b*): The first, characterised by the occurrence of an isolated oval, sickle- or horse-shoe-shaped, or ring ulcer; the second, by the occurrence of multiple, mostly round, small spots of infiltration, with subsequent partial ulceration, and severe secondary implication of the conjunctiva. Transition forms and deviations from the types described, of course, occur. These primary marginal infections of the cornea are purulent in nature, and may develop hypopyon.

The bacillus (which is figured) is straight, or only slightly curved, 0·9 μ long, 0·6 μ broad, with rounded ends. It takes the ordinary stains, but not that of Gram. Two may lie together, end on, like diplobacilli. Zur Nedden enters in detail into its cultural reactions and differential diagnosis. A table of the cases studied, thirty-three in number, is embodied, and shows at a glance the clinical features of each case and the bacteriological results. Staphylococci and the xerosis bacillus were sometimes present in small numbers, as well as the new bacillus.

The bacillus has not been met with by Zur Nedden in any case of conjunctivitis, or lachrymal sac trouble, but solely in the marginal portions of the cornea when affected in the way described. He believes that in these cases it plays an etiological part; and this is borne out by the fact that when inoculated into the cornea of a rabbit it produces an inflammation, whose intensity depends on the amount and virulence of the culture used.

W. WATSON GRIFFIN.

FRIEDENWALD (Baltimore). Wound of the Occipital Region followed by Hemianopsia. *Archives of Ophthalmology, May,* 1902.

There are but few cases on record of an injury to the cerebrum being productive of hemianopsia, consequently the notes of Friedenwald's case are of considerable interest. It was that of a man, aged 30, engaged as overseer at certain railroad works in Virginia. Under his orders were a number of Italian workmen, one of whom, having a quarrel against him, took an opportunity when he was looking away and stabbed him in the back of the head with a strong clasp knife. The patient fell to the ground, but was not unconscious, and was able to wrench the knife out of his head, bending the blade as he did so with the force employed. He stated that he was blind from the moment he was struck, but was able to mount the horse beside which he was standing and ride eight miles to camp. Arrived there, he became unconscious, in which state he remained between two and three weeks, and immediately on recovery he noticed that his sight was defective; the wound took two months to heal. Since that time he had been liable to epileptiform attacks, a symptom from which he had never in his life suffered until six months or so after the injury.

On examination the man was found to be, except for the condition indicated above, in excellent health. At the spot where the knife had entered there was a linear scar, pressure on which produced a sensation of nausea. Central vision was perfect, but there was absolutely complete left homonymous hemianopsia, no perception of light even existing on the blind side. The light reaction of the pupil was present on each side of the field. The fundus showed nothing pathological. The first symptom of an epileptiform seizure approaching invariably was that he became quite blind, but had visual mental pictures of red and other coloured spots, of faces and persons; on the blind side he only perceived flashes of light; consciousness was then lost; these attacks were somewhat frequent.

The knife with which he said he was injured was shown to Friedenwald, and was found to have a blade about 7·5 cm. long; there was a sharp bend 2 cm. from the point, caused, according to the patient, when he forcibly wrenched it out of his own head; the blade was about 1 cm. wide at this bend. Making allowance for the thickness of the skull then it may be supposed that the brain itself had been penetrated to a depth of about 1·5 cm.

Thinking it not improbable that a splinter of the inner table had been driven in and was causing the epileptiform seizures and the hemianopsia, Friedenwald invited a surgeon to trephine. This was done; the wound was found to agree very exactly with the middle occipital lobe (on the right side probably, but Friedenwald omits to mention); there was no splinter from the inner table to be found, but there was adhesion between the dura and the pia and a smooth cicatrix in the brain surface. Such being the state of affairs, the surgeon did not feel disposed to proceed further and the wound was closed up. The operation was not productive of any benefit; the fits returned very speedily, and the hemianopsia was quite unaltered.

Especially if the view be correct that the visual centre lies rather on the mesial surface of the occipital lobe, it is not easy to see how so small an injury had produced so precise and so complete a hemianopsia. Friedenwald inclines to the view that it was due to a hæmorrhage into the optic radiations of the occipital lobe, all the more that unconsciousness did not come on till after some hours and lasted a long period.

W. G. S.

SAVAGE (Nashville, U.S.A.). Ophthalmic Myology: a Systematic Treatise on the Ocular Muscles. 1902.

This monograph of six hundred pages is the embodiment of its author's views regarding the physiology and mechanism of the ocular movements, the methods by which they may be studied, their possible defects, and the measures to be resorted to for the purpose of correcting those defects. In some measure it sets forth views widely held. His agreements with certain Americans who have written much of late years on these subject are numerous. But on certain points he is consciously and conspicuously at variance with generally accepted teachings.

The work deals first with fundamental principles of ocular motions. Then in a chapter headed "Orthophoria," he discusses the factors that produce muscular balance, the various instruments proposed for testing it, and the effective powers of the ocular muscles. After this "Heterophoria" is considered, with separate chapters on "Esophoria," "Exophoria," "Hyperphoria and Cataphoria," "Cyclophoria," "Compensating Cyclotropia," and "Compensating Heterotropia."

Under the heading "Heterotropia" are considered in a single chapter all forms of comitant or non-paralytic strabismus. "Paralysis and Paresis of the Ocular Muscles" claim a chapter, and the last chapter is devoted to the "Muscles of the Iris and Ciliary Body."

Definite and dogmatic statements command attention if not acceptance, and the book is clearly written and positive throughout. But many of its statements are opposed to the views generally held, and if the author has succeeded in "invariably giving his reasons," his reasoning seems at times inadequate or inappropriate.

To him who wishes to study one of the most striking movements in ophthalmology of recent years, this book is essential. To any careful reader it will prove suggestive. Its criticism of the so-called "Law of Listing" brings out the imperfection of that much-quoted formula, but the reviewer would not recommend this book to the student as a well-proportioned account of its subject, or as a safe and sufficient guide in practice.

FRENCH OPHTHALMOLOGICAL SOCIETY.

(*Continued from p.* 300.)

Incipient Cataract treated with Iodide of Potassium.—M. Badal has for the last four years treated cases of early cataract in this way in the hope of causing their arrest. The appearance of the opacity is not, however, the really initial point in the disease of the lens, and treatment, to be effective, should be begun before this symptom manifests itself. When employing any local treatment, the question at once presents itself—Is absorption of the drug possible, and if so, to what extent does it take place? It appears that after the instillation of iodide of potassium into the conjunctival sac it may be demonstrated in the aqueous and vitreous humours, though not in the lens, and in this way Badal thought improvement in the nutrition of a lens might probably be attained. Accordingly, he has treated a number of patients in this way, and believes that the opacity of the lens has been arrested, even if it has not cleared up. The strength of solution employed was 2·5 per cent. of iodide of potassium in distilled water as an instillation, lotion, or ointment.

Partial Amputation of the Globe.—MM. Picot and Aubaret advocate a method by which the entire cornea is removed as well as the lens, and if necessary a small quantity of vitrous humour. In order to provide a stout cushion in front of the vitreous which will afterwards afford a good base for an artificial eye, they employ the muscles, which are stitched over the gap, thus drawing the scleral lips of the wound into close and firm apposition. [The description of the operation in the report of the authors' communication is, unfortunately, by no means clear.]

Extirpation of the Ciliary Ganglion.—M. Rohmer. We hope to publish later a review of this paper.

OPHTHALMOLOGICAL SOCIETY OF PARIS.

JULY, 1902.

Coloboma of the Optic Nerve.—M. Valude related a case of this rare condition. At the lower edge of the disc in the left eye was a white area about equal in size to the disc itself, across which ran a darkly pigmented band, in passing over which the vessels underwent no change in position. The disc itself was clearly outlined, its inner border pigmented, its outer part showing a slight excavation. On subjective examination the blind spot was found to be larger than normal, and vision, on correction of the refractive error, was one fourth of normal.

Sympathetic Ophthalmia following Dislocation of the Lens.—M. Wuillomenet exhibited a patient illustrating this occurrence. Four and a half years ago the man received a blow from a fist on the left eye ; pain and reaction were severe at the time, but no surgeon was consulted, as everything quieted down in a few days. A year later the patient came for the first time under observation, having suffered for three weeks from severe iridocyclitis with increased tension and dilatation of the pupil, floating opacities in the vitreous, and subluxation of the lens. Under pilocarpin locally, and mercury by inunction, the eye calmed down again ; but eighteen months later the patient returned suffering from an iridochoroiditis of the right (hitherto normal) eye. Under suitable treatment this passed off in three weeks, only to be followed in a month by another attack, however. The patient had had neither syphilis nor rheumatism, and the author looked upon the case as a genuine one of sympathetic inflammation, although there had been no wound, not even the slightest abrasion of conjunctiva : he considered the affection to be reflex by way of the peripheral twigs of the great sympathetic. The usual line of treatment was followed—atropin, fomentations and mercury. The vision in the originally injured eye at the present date was fairly good, but that of the sympathising one was much reduced.

M. Chevellereau, in discussion, doubted the existence of luxation of the lens in the original eye, and did not regard the lesion in the second eye as sympathetic at all.

Traumatic Paralysis of both Superior Oblique Muscles.—M. Demicheri (Monte Video). A review of this paper is published on another page.

CLINICAL NOTES.

EPITHELIOMA OF THE EYELID TREATED WITH ADRENALIN.—The astringent power of adrenalin has apparently proved of service by causing the gradual shrinking and death of an epithelioma in a patient under the care of Marple, of New York. The patient was a lady, aged 45, who had had a growth on the lower eyelid for about six years, during which time it had gradually increased in size, and latterly had given some trouble by bleeding. There was no doubt, on the ground of the clinical appearances, that the condition was one of true epithelioma; and microscopic examination of a small portion excised for the purpose gave corroborative evidence. Marple happened to be leaving town at the time of the consultation, and gave the patient suprarenal extract to use as a placebo until his return. Six months later the patient came under observation again. It appeared that for three months she had used the adrenalin (1 in 1,000) constantly, and for the rest of the time occasionally, and had noticed the gradual disappearance of the tumour. This had practically vanished, leaving a cicatrix as good as the surgeon could have expected to be present after operation. The patient, it is fair to add, seemed to be unusually susceptible to the local action of adrenalin.—*New York Medical Record*, August 23, 1902.

MIND-BLINDNESS FOR OBJECTS.—Word-blindness indicates the condition in which the patient may be able to read the individual letters of a word, and even to read that word as a whole, but in which at the same time the symbol conveys no idea to his mind, any more than if it were in a foreign tongue. Lépine reports a very singular and somewhat analogous type of case, in which the patient had apparently perfect vision, he saw an article and recognised its outline, its relief, its colour, its form, but remained at the same time entirely ignorant of its nature and its use. This mind-blindness for things was not complete, and did not exist for articles which had previously been very familiar to him in his work. He was a very intelligent man, aged 30, a commercial traveller for watches, &c., who had for some months had vague and partial attacks of paralysis. At the time of observation he was indifferent to affairs, his memory was defective, but he had no definite paralysis of any kind, and there was no aphasia or amnesia; his speech was perfect. Vision was, however, not quite intact, he seemed to have difficulty in fixing any object, but had no hemianopsia, and he could not read quite well. Objects with which he had formerly been very familiar, for example, watches and clocks of all kinds, were readily recognised and named, but other things, such as a pot of ointment, a measuring tape, &c., he had no recognition of, and could not imagine their use. Pictures of objects he appeared to recognise more readily than the objects themselves. He could write and copy perfectly, but if asked to draw a common object, such as a tree, he merely wrote the word "tree," and could make no attempt to sketch it. He appeared to have lost the visual memory of the object altogether.—*Recueil d'Ophtalmologie*, *July*, 1902.

FUNCTIONAL STRABISMUS.—In a short paper entitled "Functional and Paralytic Strabismus," St. John Roosa draws attention to certain erroneous ideas concerning the nature, and more especially the nomenclature, of strabismus, which, in his opinion, are still widespread. He thinks the term "concomitant" in the definition of squint should be abolished; all squint with the exception of paralytic squint is necessarily concomitant. It is much better, in Roosa's judgment, to adopt the names "functional strabismus" and "paralytic strabismus" as suggested by Panas, to describe the two great varieties of strabismus. The latter form may be monolateral; the former in the very nature of things cannot be so. Panas, when proposing his new operation on both interni at one sitting (a plan which Roosa strongly supports), said: "The conception of the unilateral character of strabismus, while it is true of the paralytic variety, or that due to contraction of the muscle, is absolutely incorrect as to that which concerns concomitant strabismus." He then gave the proper name of functional to concomitant strabismus.—*Medical Record*, May 3, 1902.

DETACHMENT OF CORNEAL EPITHELIUM.[1]

By J. Acworth Menzies, M.D. (Edin.).

It has happened to me to meet with several cases of this condition recently, and the fact that there is very scanty reference to it in the text-books is my apology for bringing the subject forward. Essentially the condition is one of defective attachment of the surface epithelium of the cornea to Bowman's membrane, and it usually follows a superficial abrasion. v. Arlt[1] appears to have observed cases as long ago as 1869, and to have published his observations first of all in 1874. He considered that the new epithelium formed after the abrasion was not firmly enough attached to the subjacent tissue and so easily became separated. Grandclément[2] described similar cases in 1888 as cases of traumatic keratalgia, and in 1889 Bronner[3] read a paper on the subject before the Ophthalmological Society in which he stated that when other means failed, cure might be effected by excision of the corneal cicatrix. For a full account of the historical aspect of the subject the papers of Szili[4] and v. Reuss[5] may be consulted. Szili may be said to have crystallised the whole subject in his admirable paper "Ueber Disjunction des Hornhautsepithels," and v. Reuss's later paper, "Die Erosionen der Hornhaut und ihre Folgen," still further serves to give a clear presentment of the subject.

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[1] Read at the Meeting of the British Medical Association (Section on Ophthalmology), Manchester, 1902.

My own attention was first called to the matter in 1899 by a case which was published in the *British Medical Journal*[6] in February, 1900. The patient was a woman who had suffered for five years, and who dated her trouble from a blow with a cricket ball. She had been under treatment without avail, and her life was made miserable by the fact that any movement of the lid over the cornea gave her acute pain. There was no foreign body, and it was only with great difficulty that I made out a ruffling of the epithelium at one spot. Bandaging was of no use, and ultimately I scraped the diseased area thoroughly and obtained a permanent cure. Since that time I have been enlightened by the papers to which I have referred, and others, and also have met with five other cases and one doubtful one.

I will describe very briefly the symptoms, causation, pathology and treatment of the condition, and give short notes of the six typical cases I have seen.

Symptoms.—In all cases there are recurring attacks of pain, but there are two main types: (1) In the first of these the attacks usually occur on opening the eye in the early morning or during the night, or it may be on rubbing the eye in a certain way. In this form the duration of the pain is brief, and in the intervals the surface of the cornea may appear normal, or at the most may show a tiny grey speck. But even then Szili has shown that it is possible to raise a fold of epithelium with forceps. (2) Of the second type the case which I have related may be taken as an example. At one spot is a patch of epithelium resembling a collapsed blister, and the movements of the lid over this acting on the nerve endings give rise to the feeling of a foreign body being present. The epithelium may be clear or it may be opaque, and, so far as my experience goes, the pain seems to be less severe in the latter case.

Causation.—In the majority of cases there is the history of a blow or other injury. In four of Szili's cases there was no history of injury. In my own cases the history of injury was definite in all but one, and in that the patient was somewhat vague as to whether the trouble began with his getting some coal dust in his eye or not. The other patients ascribed their condition to injuries with a cricket ball, a tennis ball, a broom handle, finger-nail (two cases), and a chip of iron respectively.

Pathology.—In the traumatic cases there has been a superficial injury to the cornea, following which the epithelium has not become firmly attached to the subjacent tissue. Then, as in dry catarrh, the inequalities of the corneal epithelium become interlocked with corresponding inequalities on the tarsal surface when the eyes have been closed for a time. When the eye is suddenly opened the lid pulls upon the corneal epithelium, raising it in the form of a blister and dragging upon the nerve filaments so as to cause pain. In cases of the first type the detached epithelium soon settles down again and the lid moves smoothly over it. In the second type of case the movements of the lid continue to drag on the epithelium, which becomes stretched so as to form a blister. This blister may burst, when the ragged epithelial margins are easily detected, or an ulcer may result. This occurs at or near the site of the original injury. The pain is very severe. Szili has examined pieces of the detached epithelium microscopically, and finds that the cells show shrinking of the nuclei with perinuclear vacuole formation, and also that intercellular spaces appear, some of them filled with granular masses. v. Reuss suggests that the movements of the lids draw out the epithelial cells at the edge of the original abrasion in length, as has been shown by Carl Hess to occur in filamentous keratitis. He believes that this condition only occurs after a superficial injury, and that if deeper scar tissue is formed the epithelium becomes firmly attached to it. Grandclément and a few other writers have described attacks of pain following an injury and ascribed them to a neuralgic condition, but in all probability in these cases a detachment of the epithelium would have been found if it had been carefully looked for. Szili points out that when other methods of examination have given a negative result, ophthalmoscopic examination will often reveal the lesion as an irregular shadow on the cornea. Stood[7] considers that the regenerated epithelium does not become attached to the injured Bowman's membrane so firmly as is normal, and that during the night it is sucked from its bed by the tarsal conjunctiva and torn away by the movement of the lid on awakening. Then transudation of lymph occurs and keeps the surfaces apart. Weigandt[8] quotes Schoeler's theory that a tiny foreign body is left under the epithelium. This prevents union and causes effusion of lymph, which leads to further detachment. Weigandt himself agrees with v. Reuss, but proposes to add a third group to the classification, viz., cases of keratitis bullosa of traumatic origin. My own observations lead me to agree with the advisability of adding this third group for those cases where the detachment remains fairly permanent, the epithelium is opaque and the pain less severe.

Diagnosis.—This depends largely on the history. In cases of the first group the characteristic feature is the pain on opening the eye in the morning. In the more severe cases fluorescin may be used, and will reveal the site of the lesion if there is any degeneration of the epithelium. I prefer to depend on gentle pressure of the lower lid against the cornea while the patient looks down. By that means the slack epithelium is easily discovered, if it is detached at the time of examination. The prompt recognition of the condition may save the patient weeks, or as in one of my own cases, years of pain. Suspicion should be aroused when the patient is obviously suffering extremely, and there is apparently only a slight corneal lesion or none at all.

Treatment.—(1) Prophylactic. It is probable that if one could keep the eye closed and completely at rest after a corneal abrasion, detachment of the epithelium would not occur. The lids at least may be kept steady by a firm bandage for a few days, and in some cases it might be possible to persuade the patient to lie in bed with both eyes bandaged till healing had occurred. But, generally speaking, in most cases thorough prophylactic treatment will be out of the question. (2) When the detachment has occurred, the treatment will vary according as the case belongs to the first or second group. In the former case one should aim at promoting the attachment of the epithelium to its bed, and of preventing the occurrence of the matutinal attacks of pain. For these purposes v. Reuss advises the use of a neutral fatty substance to be put in the eye on going to bed. He also recommends daily massage through the eyelid with boric lanolin or yellow ointment. Cocaine drops may be kept at hand during the night, to be used if necessary. Stood advises massage with ointment at night, and dry massage in the morning before opening the eye, followed by massage with ointment after the eye is opened. He believes that massage leads to a firmer attachment of the epithelium.

In the cases of the second group my experience has been in agreement with that of Szili and v. Reuss. All treatment has proved unavailing until the epithelium has been thoroughly removed from the affected area and for some distance around. I have also found that the new epithelium may not attach itself to the underlying tissue until the surface has been scraped with a sharp spoon. After the little operation the eye is firmly bandaged and the patient kept in bed for a few days till healing is complete. The bandage may be removed daily to allow of the eye being bathed with boric lotion. A permanent cure is effected in this way.

Case I.—Mrs. W., seen first August 4, 1899; duration, five years; cause, blow with cricket ball (*v. antea*). Prescribed bandage and drops of boric acid and cocaine. *October* 6.—No better; scraped affected part thoroughly. *October* 30.—Better; has remained well ever since, except for slight ulceration of the cornea in December, 1899.

Case II.—M., man, aged 43, seen first December 23, 1900; duration, six to eight months; cause, probably coal dust in eye. Removed epithelium. Atropine, lotion of zinc chloride, bandage. *January* 21.—Epithelium detached as before; bandaged and kept in bed three weeks. *February* 15.—No better. Scraped thoroughly; better one week later, and has remained well.

Case III.—G. J., man, right eye injured with tennis ball. Abrasion of cornea; healed well; since then has complained of pain on waking occasionally, or when the eye is rubbed in a certain way. Is under treatment—ointment and massage.

Case IV.—Miss S., April 12, 1902; attacks in one eye (left) on waking suddenly. Have occurred every now and then for two years since blow on the eye with a broom handle. Ointment and massage.

Case V.—Mrs. H., aged 58, seen first June 2, 1902. Right eye bad four months, since scratch with baby's finger nail; ulcer of cornea. *June* 16.—Epithelium healed over ulcer, but detached; scraped. Atropine, boric lotion, bandage. *June* 23.—Epithelium healed but again detached; scraped more thoroughly, removing epithelium from entire cornea. *June* 30.—Quite firmly healed; remains well up to the present.

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CASE VI.—Mrs. B., aged 63; seen first July 11, 1902; left eye bad two or three months, since scratch with thumb nail. Epithelium, lower half cornea, detached; scraped, boric lotion and bandage. *July* 19.—Quite firmly healed. *July* 26.—Feels quite well.

REFERENCES.

[1] v. Arlt, "Ueber die Verletzungen des Auges in gerichtsärztlichen Beziehungen," *Wiener med. Wochenschrift*, 1874 (also later papers).

[2] Grandclément, "Trois nouvelles Observations de Kératalgie traumatique," *Lyon méd.*, 1888, p. 587.

[3] Bronner, "On some Forms of Traumatic Keratalgia," *Ophthalmological Society Transactions*, 1889.

[4] Szili, "Ueber Disjunction des Hornhautsepithels, *v. Graefe's Archiv*, li., 3.

[5] v. Reuss, "Die Erosionen der Hornhaut und ihre Folgen," *Cent. f. prakt. Augenheilk.*, 1901.

[6] Menzies, "Detachment of Corneal Epithelium (?)," *British Medical Journal*, Feb., 1900.

[7] Stood, "Ueber recidivirende Blasen-bildungen auf der Hornhaut des Auges und 'Keratalgien' nach Verletzung der Hornhaut-Oberflache," *Archiv f. Augenheilk.*, xliii., 4.

[8] Weigandt, "Zwei Falle von Keratitis bullosa nach vorausgegangener Erosio Corneæ," *Cent. f. prakt. Augenheilk.*, 1902.

ON A LITTLE-KNOWN METHOD OF EXAMINING THE ANTERIOR SURFACE AND CURVATURE OF THE CORNEA.

BY SYDNEY STEPHENSON, M.B., C.M.

WHILE examining the anterior parts of the eye by means of the small concave mirror and a + 20 D. spherical lens, every one must have noticed a strikingly bright image of circular outline. For several years I have been in the habit of attaching some little importance to the clinical significance and diagnostic value of this image. It is, of course, an image of the edge of the mirror reflected from the surface of the cornea.

and, like all images formed by convex mirrors, it is erect, negative, and smaller than the luminous object of which it forms the reflection. It becomes larger the nearer one approaches to the eye under examination.

Supposing it to be reflected from the central parts of a normal cornea, it is absolutely circular in outline. If, on the contrary, the reflection be obtained from the periphery of the cornea the circular outline is replaced by an oval figure, the major axis of which is horizontal if the transverse meridian of the cornea is approached, and vertical if the vertical meridian is approached. No well-defined or unbroken reflection can be got from the ocular conjunctiva in the neighbourhood of the cornea, because that membrane furnishes anything but an ideal surface for reflection.

The mirror-reflex, when closely examined, is found to include (*a*) a smaller, circular spot, which represents the central perforation in the mirror; and (*b*) a small, upright image of the flame, gas, or electric light, as the case may be. (*b*) Shifts its position within the mirror-reflex in the reverse direction to the movements of the mirror.

I have found an examination of the mirror-reflex of service in two conditions, viz.: (1) In disturbance of the anterior epithelium of the cornea; (2) in departures from the normal curvature of the cornea.

The first is well exemplified in the stippling of the anterior epithelium common in cases of commencing interstitial keratitis, where the ring-reflex is broken up and distorted over the affected portion of the cornea, while normal elsewhere. The same thing is seen when portions of the epithelium have been lost after an injury to the eye.

When the normal curvature of the cornea is disturbed, the mirror-reflex is distorted in various ways, according to the exact kind of disturbance present.

This may be seen, to some extent, in cases of high regular astigmatism, but is much more pronounced in the alterations in curvature produced by an adherent leucoma or a conical cornea.

Examination of the mirror-reflex, it will thus be evident, is a convenient clinical substitute for a so-called keratometer, as Placido's disc, &c. It is, in fact, a rough-and-ready means of examination. It is, however, convenient in actual work, because every surgeon who possesses a refracting ophthalmoscope possesses also a fair substitute for a formal keratometer.

REVIEWS.

A. R. v. REUSS (Vienna). The Field of Vision in Functional Nervous Disorders. *Leipzig and Vienna, Franz Deuticke.*

This somewhat operose paper is based on the perimetric records of 85 cases of functional disorders personally examined by the author. The cases, with seven exceptions, were of traumatic origin, and for 59 of them railway accidents were responsible.

Before describing the anomalies of the visual field the author discusses the normal field of vision. He considers that defined by Förster (nas. 60, sup. 55, temp. 90, inf. 70) to be too large, and thinks Haab's (nas. 45, sup. 40, temp. 70, inf. 65) more correct. The size of the object, strength of illumination, and position of the head and eyebrows were as far as possible the same in all cases.

In estimating the colour fields the patient was required to distinguish the colour by name, and to endeavour to maintain the same subjective estimate of the colour during the examination. Squares of 1 cm. were used. The colour fields, as found in ten intelligent persons between 20 and 30 years of age, were very variable, and taken altogether were smaller than those generally accepted. Varieties in the colour fields of the two eyes in the same patient were not uncommon, but the differences need to be very pronounced before they can be regarded as pathological.

The anomalies of the field of vision are classified under three headings: (1) Hysteria; (2) Neurasthenia; (3) Mixed Cases.

(1) The fields of *hysteria* are characterised by: (*a*) Concentric limitation of the field with normal or reduced visual acuteness, and with normal fundus. This limitation varies but slightly and slowly if at all, and is associated with constriction and variation in the colour fields. It may be unilateral or bilateral, and transposition from one eye to the other is possible. The limitation may exist for colour fields only. This hysterical field differs from that due to exhaustion in that it appears at once and not *during* the examination, and also in that there is no extension of the field when the patient's attention is stimulated. (*b*) Oscillating fields with scotomata: This form is usually associated with (*a*), and was described by Wilbrand and König. The object disappears and reappears several times in the same meridian; the same oscillation applies to colours. This phenomenon is ascribed to rapid change in the sensitiveness of the retina. Careful examination would show ring scotomata or fragments of such. There may be a double ring scotoma, or the oscillating field may be associated with central scotoma, scintillating scotoma, or hemianopsia. An important point is, that all scotomata possess a certain degree of stability which distinguishes them from "*exhaustion*" cases.

(2) The fields in *neurasthenia*. The appearance of the fields in hysteria is due to the absence of function in certain parts of the retina. Neurasthenia is characterised by the easy exhaustion of the visual apparatus, giving rise to visual fields of a fleeting and changing nature. Limitation of the field only appears during the process of examination, or if present at the commencement, is due

to exhaustion of the eye by previous examinations. Five types of exhaustion fields are recognised. (*a*) The shifting type, described by Förster in cases of "Anæsthesia Retinæ." When taken with a full diameter perimeter, such as Förster's, the field is restricted on the side of exit of the object, *i.e.*, the fields differ according as the examination is conducted from temporal to nasal side, or from nasal to temporal side, the contraction being pronounced on the nasal side in the former, and on the temporal side in the latter. Förster observed similar fields for colours. (*b*) Exhaustion type of Wilbrand. The examination is again made with a full diameter perimeter (diametrical method of Schiele) and is confined to the horizontal meridian, but the object is carried out from temporal to nasal, and nasal to temporal sides, several times in succession; in fact, as often as the field continues to diminish. (*c*) Concentric limitation: similar in form to that of hysteria, but differs in that it is constantly changing, whilst the hysterical contraction does not vary until recovery. The colour fields are not usually disturbed. The field gets smaller when the examination is repeated, and the contraction is most marked in the eye which is last examined. Repeated examinations with the ordinary perimeter give a series of concentric fields, and by the diametrical method, using the horizontal meridian only, we get the "Exhaustion type of Wilbrand." (*d*) Exhaustion Spirals. The field is examined in the ordinary way with McHardy's perimeter, but the circuit is repeated several times. The outline thus traced appears coiled like a watch-spring in consequence of the limits becoming concentrically smaller. It is well to exhaust the eyes by testing refraction, &c., first, and to avoid moments of rest and much talking during the examination. The colour fields are similar in appearance. The eye examined first should be noted and likewise the order in which the colours were taken. (*e*) Recuperation extension type. A diminished field may extend during rest, or the extension may be due to strong efforts of will (Negative Spirals of Fuchs). These are best shown when the examination is made in a darkened chamber and the object is held a good distance off.

(3) The fields in *mixed* cases. Cases showing signs both of hysteria and neurasthenia are not uncommon, especially among cases of traumatic neuroses. The fields in these cases show evidence of the two complaints, *e.g.*, a constant concentric limitation (hysteria) with exhaustion spirals (neurasthenia). In making a diagnosis care must be taken that the limitation is not due to an organic lesion, such as glaucoma. A detailed examination of the 53 cases studied since November, 1898—when spirals were looked for—showed that 40 had exhaustion spirals, and that in 13 cases spirals were absent. The spirals were variable in form, some of them diminishing regularly ("watch-spring" spiral), others were more open at the outer turns and closer at the centre ("snail-shell" spirals). Some do not begin to diminish for several turns, and even then the lines cross and recross, forming a sort of interwoven wreath ("crown of thorns" field). Others may begin to get less during the first turn, but no further contraction takes place (abortive spiral); whilst if the exhaustion is marked, the spiral, though beginning moderately near the periphery, falls quickly to zero (falling spiral). The number of turns in the spirals varied from 1½ to 9. The initial fields were normal or diminished, colour spirals generally started from a diminished field.

Ophthalmoscopically, the cases presented nothing abnormal except in five cases, which showed some hyperæmia of the retina, disc, or choroid.

The visual acuteness (refraction being corrected where necessary) was generally normal, or could be brought up to normal by persuasive means, unless there was organic lesion of the eyes or nervous system.

In discussing the nature of exhaustion the author mentions three theories. (*a*) Diminution in the receptive power of the centre (Placzek). (*b*) Exhaustion of the psyche (Simon). (*c*) Physiological variation in the power of concentration (Salomonsohn and Voges). He favours Simon's theory as being more comprehensive than the first and third.

The author's conclusions as to the value of limitations of the field for diagnostic purposes are as follows: Fundus and vision being supposed normal, (*a*) Limitations which do not change during examination and do not materially differ under control—examinations at short periods indicate *hysteria*, and other symptoms of the disease should be looked for. (*b*) If the fields, at first normal, change during the examination, *neurasthenia* should be diagnosed. The same inference should be drawn if the fields, at first contracted, become enlarged up to normal during the examination. (*c*) An initial diminution of the field (not a consequence of exhaustion), which goes on increasing during examination, indicates *hystero-neurasthenia*. The changes in the fields can only guide us in the diagnosis of the nervous lesions and do not justify us in drawing any conclusions as to the cause of the complaints. The author's cases were traumatic, but the same changes in the fields may be found in simple neurosis without trauma, or in psychical shock, the result of organic disease. The degree of change in the field bears no very definite relation to the gravity of the neurosis. The changes were often most marked amongst the graver cases, but on the other hand some slight neuroses showed large changes in the fields. Further, hysteria or neurasthenia (traumatic or otherwise) may exist without any changes in the fields.

J. JAMESON EVANS.

J. WIDMARK. The Etiology of Myopia. *Mitteilungen aus der Augenklinik des Carolinischen Medico-Chirurgischen Instituts zu Stockholm, iv.*, 1902.

The question as to the etiology of myopia has been answered by a number of theories, but hitherto only very unsatisfactorily. Widmark, in the above paper, in which he analyses 200 cases of myopia which have been under his personal observation, tries to get nearer to a correct solution. He comes to the following conclusions: If, from whatsoever cause, the vision of one eye has been impaired before school age, school myopia develops, as a rule, either exclusively or at any rate to a higher degree in the eye that has the better vision; this occurs both when the other eye takes part in the binocular fixation, and also when divergent or convergent strabismus supervenes. Even when one eye has been enucleated, or vision has been destroyed, typical myopia may develop in the remaining eye. It follows, therefore, that convergence cannot be the determining cause of myopia, because in the one-eyed, convergence is absent altogether.[1] Nor can accommodation be made responsible, because in hypermetropia, the accommodation required, especially during school years, is much greater than in myopia; yet hypermetropic eyes rarely develop myopia at all, while myopic eyes very often become more myopic.

The author attributes the principal cause of the development of myopia to "work," to the effect of the act of seeing and to the accompanying changes in the macula. He says: "It does not appear improbable to me that the effort of distinguishing images changing quickly and constantly, *e.g.*, of the letters when reading or writing, may lead to the hyperæmia of the fundus, which is assigned by various theories as the real cause of the myopic changes of the posterior pole of the eye." The effort of distinguishing quickly following and changing images, such as those of the letters when reading and writing, is present for every eye, independently of its state of refraction; why, therefore, myopia should be produced in some cases and not in others remains as unexplained as if this hypothesis had not been brought forward. It is just as little an explanation as the following, which occurs on p. 80: "In other cases with emmetropia of both eyes, myopia develops only in one eye—perhaps owing to a greater disposition to myopia." This is a statement of a fact, not an explanation of it. Much more acceptable is the hypothesis that the accumulation of the products of fatigue may have a detrimental effect on the ocular membranes. The hyperæmia may lead to a softening of the tissues in the region of the posterior pole, and thereby cause them to yield to the intraocular pressure, especially in the young. In graver cases both these causes may combine and produce inflammatory, and later on atrophic, changes.

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[1] Is it? If one has been in the habit of convergence and accommodation, mere removal of one eye will not abrogate the old relationship between contraction of the ciliary muscle and of the internal rectus. After removal of an eye a man still holds his book, &c., in the middle line, not to the side in which there is an eye. Quite apart from the question of the cause of myopia, to assume that "convergence" (except in one sense) ceases on removal of one eye is not warranted.—EDITOR.

The ectasia at the posterior pole would be due not to the increase of the intraocular pressure, but to the decreased resistance of the membranes. Increased intraocular pressure does not lead to increased refraction, but to cupping of the optic disc. This is shown where glaucoma occurs in myopic eyes.

Finally, the author disposes of the recently expressed opinion that the frequent blinking of the myopic eye produces an increase of the myopia by raising the intraocular pressure. He points out, rightly, that the myope blinks only for distant, not for near vision. And it is only the near vision that produces myopia.

K. G.

CHEVALLEREAU. The Total Correction of Myopia.

VACHER (Orleans) and BAILLIART. The Influence upon the Progress of Myopia of its Total Correction. *Annales d'Oculistique, September*, 1902.

On the subject of the wisdom or unwisdom of the total correction of myopia a number of papers have appeared, especially within the last year or so, of which the above are among the most recent. The subject is of course by no means a new one, and the authors have no new light to throw upon it. At one time the opinion was pretty generally held that in any and every case of myopia the wisest course to pursue was decidedly to under-correct the refractive error, under the idea that one of the most important factors in the advance of myopia was the injurious effect upon the choroid of the action of the ciliary muscles; by incomplete correction of the myopia accommodation was prevented. But gradually the opinion has gained ground that the influence of accommodation has no such injurious result; some indeed advocate full correction on the ground that the compression of the weak globe by the internal rectus is the main fountain of evil. These say, and with some show of reason: a myope holds his work very near the eyes—at or within his far point—and therefore compresses his globe severely in the endeavour to converge sufficiently to bring the two maculæ to bear upon the object of fixation. Remove this object of fixation to a greater distance by applying a concave lens and you will then lessen his convergence, and at the same time his risk of increase in myopia. Förster considers the faulty positions adopted by the myope as the principal cause of increase, and finding that partial correction is not successful in inducing a new attitude and habit, strongly advocates full correction. The idea that by putting on such lenses as will place his far point at 33 cm. you will necessarily alter the vicious habit, is a mistake, because it does not take into account the question of convergence and the relation between it and accommodation. In the case of a patient with 5 D. of myopia, for example, if you order – 2 D., no doubt you now place his far point at 33 cm. instead of at 20, and you expect him to read at this distance, exerting no accommodation while employing some convergence. You have disturbed the old relationship without substituting a better, and the patient is apt either (*a*) to converge and then he must accommodate, when he will be obliged to shorten the distance still further, or (*b*) to refrain alike from accommodation and convergence, when he may readily learn to acquire divergent strabismus, or (*c*) to attempt to separate the two associated functions, when he will suffer from asthenopic symptoms. Speaking generally, then, the better plan is to advise full correction in such a case.

A further point of interest in the matter is, that all surgeons are not agreed that the action of the ciliary muscle is harmful; indeed, according to some observers accommodation has not an injurious, but actually a distinctly beneficial effect upon the eye; they say that the tissue of the corneo-scleral junction, just at the part at which filtration takes place, has its origin in and among the tendinous cords and supporting tissue of the ciliary muscle; the contractions, then, of this muscle during accommodation must have the effect of driving the current of fluids into the filtration angle—of stimulating the nutrition and the removal of effete matters from the interior of the eye. Obviously, then, if this be the case, we ought not to give our patients such lenses as cause him to dispense with accommodation. On the contrary, we ought to correct his error fully and oblige him to make use of his ciliary muscle. It is certainly significant that in myopes, as has been shown by Ivanoff and others, the circular portion of the ciliary muscle is in a state of undevelopment or atrophy. While then in a case of advanced myopia it may be undesirable to permit serious efforts on the part of the ciliáry muscle, it appears reasonable to endeavour to avoid atrophy of the muscle by encouraging its employment before the tensor choroideæ is atrophied, or the choroid has undergone so much degeneration that contraction of the muscle would be either impossible or fraught with danger.

In a very large number of patients, however, it happens that we have no opportunity of giving advice till the myopia has reached considerable dimensions. Thus one is often consulted by a patient whose myopia reaches from 5 to 8 D.; in his case what is one to do, to correct or to undercorrect? Vacher and Bailliart divide such cases into two: those in which the fundus is fairly normal and the vision on correction good, and those in which on the contrary the fundus shows a progressing staphyloma and vision remains decidedly below normal level. In the first case they advise a nearly full correction, rising each month or so by dioptre or half-dioptre steps to a total correction, the patient meanwhile being strongly cautioned against allowing book or work to come nearer to the eye than 33 cm. In the second case much will depend on the date of the choroidal lesions ; if these are very recent indeed, then atropine is indicated to prevent all action of the ciliary muscle, and all efforts at convergence are also to be put an end to, even by an occlusive bandage, if necessary, before either eye alternately, in order to establish monocular vision with this object in view. Otherwise a full correction seems indicated, and certain statistics show that there is much less tendency for myopia to advance when the fully correcting lenses are worn. The cases which present most difficulty are those in which anisometropia is a feature, but at least it is wise to aim at correcting each eye with its appropriate lens. A convenient rule of thumb, of which these two authors have made much use during the last few years, may be thus expressed : If the number of dioptres required is less than the number of years of the patient's life, correct fully, and let the patient wear this correction at all times. In patients under twenty, whose myopia exceeds their age, one should attain gradually to full correction, unless it be considered that extraction of the lens be rather indicated—an operation which these two authors consider is to be recommended only with very great caution.

Chevallereau in his paper falls, in the reviewer's judgment, into an error in regard to the behaviour of a myope thus : Take the case of a myope of 3 D. Such an one sees quite clearly without the smallest effort of accommodation at a distance of 33 cm. ; why then should he accommodate at all ? To what end would a myope make needless efforts of the ciliary muscle, whose only effect would be to oblige him to hold his work yet closer ? Is there in nature an example of a spontaneous effort made without any object in view, and the effect of which must necessarily be injurious to the organism ?—and so on. But the author seems to have forgotten the question of convergence, and that many persons, whether myopic or not, would have great difficulty in keeping up the needed degree of convergence without exercising accommodation to some extent at least. The reviewer, however, does not mean by this to imply that it is necessary, as some surgeons appear to consider, before ordering concave lenses for a patient to paralyse the accommodation; the above remark is only intended to apply to the fact that on looking at a near object a myope whose degree of error may be such that the object is just at his punctum remotum, not infrequently does bring the object nearer and accommodates quite "unnecessarily." It is however, upon the convergence that Chevallereau is convinced the blame of increase in myopia must be laid. He cites one or two examples of patients whose history shows that the supposed danger of increasing the myopia by the wearing of a too powerful lens is not very real. Everyone has seen patients wearing for years a distinct over-correction of a certain degree of myopia without raising the myopia to the degree indicated by the lenses; Chevallereau mentions as an illustration the case of a youth who for long wore —4 D. lenses for the correction of 2 D. of myopia, without doing himself the smallest harm.

Javal, according to Chevallereau, proceeded upon a totally different plan from other surgeons; he was in the custom of prescribing for a myopic patient whose error was less than 4 D., not concave glasses but actually convex, of such power that he was able to read, &c., at 25 cm. without accommodation at all; beyond that distance he was allowed to look over the top of his glasses. He seems to have disapproved of allowing concave lenses in such a case, even for distance. His patients must have been singularly docile to submit to having their disabilities quite needlessly increased by his line of treatment. Javal's reason for acting in this way was of course that he regarded any contraction of the ciliary muscle as highly detrimental. In a series of cases observed by him, Dor found that constant wearing of the fully correcting glasses did not hinder the progress of the myopia in about 40 per cent.; in about 37 per cent. it had remained stationary, while in the remainder the error appeared actually to have diminished; but besides this, the full correction appeared to have had a decidedly beneficial influence on the visual acuteness, for only in nine cases had vision deteriorated after a length of time; in all the others (55) it had either remained stationary or had actually improved. Chevallereau concludes his article with the statement that for the avoidance of increase in the error of refraction and of complications, a total and permanent correction of the existing myopia is essential. W. G. S.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

OCTOBER, 1902.

Mr. W. ADAMS FROST (Vice-President) in the Chair.

PATIENTS shown:—

Detachment of the Retina.—Mr. A. Quarry Silcock and Mr. A. F. MacCallan. The patient, a glazier by occupation, aged 32, complained of defective sight in the right eye, which had existed some four months, but there was no history of injury, pain, or specific disease to account for it, and the eye was not myopic. In the lower and outer part of the fundus of the right eye the retina was seen to be detached over a very considerable area. The detached portion, which was partially opaque, did not vibrate on any movements of the globe. The highest part of the detachment was best seen with + 8 D. A few spots of pigment, probably choroidal, were seen at the temporal border of the detached portion, also at its lower margin; where the highest part of the detachment was, and the slope to the level of the normal fundus steepest, a larger pigmented spot was visible with several small hæmorrhages in its near neighbourhood; this spot differed from the others in that it appeared at a deeper level. Another small hæmorrhage was present above the disc. The vitreous was clear. Vision: R., $\frac{6}{18}$; L., $\frac{6}{6}$. Left fundus normal.

Mr. Nettleship said he considered the probable cause to be tumour of the choroid, since the detachment was solid looking; no part of the detached portion was transparent, and it has been steadily, though slowly, increasing.

The Chairman suggested it might be of an inflammatory nature, probably tubercle.

Embolism of the Inferior Temporal Vessels with Persistent Hyaloid Artery.—Mr. C. H. Walker. The patient, a young man, complained of having a large blind area in his left eye. With the ophthalmoscope the inferior temporal branch of the artery appeared bloodless, the portion of retina corresponding not so deeply red as the rest of the fundus and somewhat œdematous looking. The persistent hyaloid vessels were clearly to be seen extending almost to the back of the lens capsule: two vessels were visible twisted round one another, each appearing to be filled with blood at the extremity; behind this a gap where the vessels appeared as if empty of blood; then the continuation of the vessels to the back of the globe apparently filled, and in one vessel at a spot at which a bend took place pulsation could be made out.

Mr. Walker considered that the absence of hæmorrhages pointed to the thrombosis being arterial and not venous. When the defect in vision was first noticed the patient had not been over-straining himself in any way, and an examination of the cardiac system elicited no signs of any lesion. It was on account of the scotoma that the patient had asked advice, and he was quite positive that this scotoma had not always been present, which might have been the case had the scotoma been caused by the hyaloid vessels acting as an opacity in the vitreous.

PAPERS :—

Dislocation of the Eyeball Forwards through the Palpebral Aperture; Immediate Reduction by Taxis; Complete Recovery. Communicated by Mr. H. Baldwin (Huddersfield) and read by Mr. Nettleship. The patient, a woman, aged 40, in October, 1897, while coming up some steps from a cellar, struck the left side of her face against a triangular globe-holder on a gas bracket, the globe of which had previously been removed. She distinctly felt the prong of the holder strike her eyebrow, and stated that she had had to hold the eye up with her hand until attended. She was seen by Mr. Baldwin within fifteen minutes of the accident, who found the left eyeball driven forwards out of the orbit and in front of the lids, which had the appearance of having closed on the posterior aspect of the globe. The eye was simply gouged out, but there was not a sign of any wound of the tunics of the eyeball and neither wound nor abrasion of the face or side of the head. With gentle taxis the dislocated globe was reduced and on reduction gave the sensation of springing back into the orbit with an elastic click. The patient was kept in bed in a dark room with iced compresses over the eye for a fortnight, and for some three months afterwards wore smoked goggles. No inflammatory or untoward symptoms supervened beyond a slight hæmorrhage under the conjunctiva to the outer side of the eyeball and a crinkled appearance of that part, as if some of the structures had been stretched. The eye was weak for some months afterwards, and there were darting pains in the other eye ; she stated, indeed, that this eye gave her more trouble throughout than the dislocated one. Both eyes were examined by Mr. Baldwin in 1902 and the vision in each found to be perfect for distance and for near ; no prominence existed of the eye which had been dislocated, only the slightly crinkled appearance on the outer side of the globe persisting to show that anything had affected this eye.

The eyes were not prominent, nor was there anything in the contour of the orbits to suggest that they were shallower than normal or were possessed of any anatomical peculiarities predisposing to easy dislocation of the eyeball.

In the discussion on this case, Mr. Beaumont said he had seen one comparable to the above in an infant which was brought to him when twenty-four hours old with a dislocated eye. Forceps had been used during delivery. The eye was easily reduced, and except for some chemosis and swelling of the orbital tissue appeared to be none the worse. For sometime afterwards, however, there was a nebulous condition of the cornea, which cleared up eventually. His theory was that the blade of the forceps had acted much in the same way as the speculum was made to act when depressed to dislocate the globe forwards during the operation of enucleation.

Birth Palsy of Sixth and Seventh Nerves on the Same Side.—Mr. Edward Nettleship. This occurred in a female infant, a first-born child, delivered at full time by the aid of forceps after a very difficult labour lasting twenty-four hours, the delay being due to premature rupture of the membranes, to brow presentation, and to the mother having a pelvis rather narrow antero-posteriorly. One blade of the forceps was applied behind the right ear, its anterior limb leaving a vertical mark on the mastoid region ; the other blade was partly on and partly in front of the left ear. The head was squeezed into a conical shape, and there was a large caput succedaneum. Almost immediately after birth, before the doctors had left the house, it was noticed that the infant's right eyelids remained open when the left lids were closed, and that the right eye squinted strongly inwards. During the next few hours some spasmodic twitching of the hands and arms occurred, which, however, soon ceased, and no other symptoms followed.

When examined on the third day after birth the infant showed paralysis of all the right facial muscles, including the frontalis and orbicularis oculi, with an inward squint of the right eye. The squint was extreme, no sclerotic being visible on the nasal side, and though the eye did occasionally move outwards it certainly never passed the middle line. The associated inward and outward rotation of the other (left) eye were full and often rapid. The pupils acted promptly to light, but the range was only from about 2·5 to 3 mm. No extravasation was visible on the eyeball or the lids of the right (paralysed) eye, but there was a small one on the left eyeball; there was neither swelling of lids nor proptosis.

On the fifth day after birth a more detailed examination was made. The paralyses were unaltered; the fifth nerve seemed equally sensitive to pin-pricks on each side; the child took no notice of noises near either ear; the twitchings of the hands and arms had ceased, and there were no signs of hemiplegia. The pupils under homatropine and cocaine dilated to 5 mm., and an examination of the fundi with the indirect method revealed a single, roundish, dark hæmorrhage just below the optic disc in the right (paralysed) eye, equal to about one-third the optic disc area. Both optic discs were seen to be clear, with normal retinal vessels. Behind the right ear a slight ridge and depression could be felt corresponding to the limbs of the forceps blade.

On the seventeenth day the facial muscles were certainly better and the squint less, some sclerotic being visible on the nasal side, and on the nineteenth day the eye was noticed to have better movement.

Twenty-eight days after birth the paralysis was much improved; there was still slight convergence, but the eye moved outwards much better, the oral and cheek muscles acted distinctly better, but the orbicularis oculi showed but little action.

Nine months after, a slight defect in the orbicularis oculi and at the angle of the mouth could still be made out, with an occasional inward squint, but recovery was practically complete. The hearing on both sides was perfect. The right optic disc showed some disturbance of pigment, but the colour of both discs was normal. Another peculiarity was the appearance of a small superficial venous nævus on the right upper lid, which remained for some months, but finally quite disappeared.

Mr. Nettleship considered that the damage in this case was intracranial, and that the lesion was single, because both nerves were at first completely paralysed, both began to improve at about the same time (seventeenth day), and in both the recovery progressed at the same rate and to the same degree. He considered the only doubtful point was as to whether the seat of the lesion was at the closely associated nuclei of the sixth and seventh nerves, or at the base where the nerve-trunks lie near together on the petrous bone. He considered that in either case the actual injury was inflicted by an extravasation of blood. He pointed out that other cases of birth palsy of the sixth nerve alone with indications of the use of forceps have been recorded by Bloch, and probably others. (Bloch, *Hirschberg's Centralblatt*, 1891, p. 134.)

In the discussion which followed. Dr. Beevor considered that the question was whether there was a lesion of the facial and sixth nerves or of their nuclei, and he had no doubt that Mr. Nettleship had given the right opinion, that the lesion was of the nerves and not of the nuclei, because it was the whole of the facial which was affected ; also with regard to the external rectus, it was only the rectus of one side, and not the internal rectus of the other. He was also of the opinion that the complete recovery of the case pointed to a nerve lesion and not to a nuclear lesion, and he thought the lesion itself to be a hæmorrhage, from the fact that there was hæmorrhage into the retina, and hæmorrhage was the most common occurrence in obstetrical cases.

Mr. Fisher considered that the great difficulty in accepting the explanation of these paralyses as being due to a hæmorrhage was that if a hæmorrhage affected the two nerve-trunks after their origin from the pons it would have to be of a very considerable size and intradural. He considered that marks of the forceps behind the right ear favoured the opinion that the facial paralysis was due to the pressure of the forceps, particularly from the position of the stylo-mastoid foramen in the skull of a new-born child, in which it was lateral in situation, though in the adult the foramen became basal. He was inclined to think that there were two lesions, one being from the direct pressure of the blade of the forceps on the facial nerve as it emerged from the stylo-mastoid foramen, and that the damage to the sixth nerve was due to hæmorrhage, possibly from the inferior petrosal sinus, on the outer side of which the sixth nerve passed after passing the dura mater.

Mr. Nettleship, in his reply, said Mr. Fisher's explanation certainly seemed to fit the facts of the case very well, though the assumption that there were two separate lesions was slightly weakened by the fact of the two paralyses beginning to recover in the same way at the same time.

Recovery of Perfect Vision in a Case of Family Optic Neuritis (Leber's Disease).—Mr. Edward Nettleship. In recording this case

Mr. Nettleship pointed out how unusual it is for even partial recovery to take place, let alone complete restoration of vision, in cases of this disease.

The patient, a tutor, aged 28, had had good sight until a few months previously to his seeking advice on account of his vision beginning to fail ; it got to its worst in four or five weeks and then remained stationary. The left eye began to fail before the right. He had been advised to give up smoking a few weeks before the commencement of the failure of sight and had done so absolutely, but without benefit. When first seen the vision was $\frac{6}{60}$ with each eye, and when using both together he could read J. 16. There was a large central horizontal scotoma for green in the left eye and a still larger one in the right. These scotomata could not be found with any certainty for red, the perception of red being relatively much better than that of green, or of black and white. The ophthalmoscope showed the discs sharply defined and rather pale on the temporal side, and the retinal arteries too small ; the retina skirting the macula lutea above and below was extremely streaky, especially so below, amounting in that situation almost to opaque nerve-fibres ; the choroid was deeply pigmented. His health was good and the knee reflexes very brisk.

At the date of his examination by Mr. Nettleship the patient stated that he knew of two similar cases in the family. These two were brothers and first cousins of the patient's, sons of his mother's sister, both were very heavy smokers, and had been in the habit of drinking too much. One was between 25 and 30 when his sight failed, and he had to give up his business in consequence, his sight never improving. The other was 35 when his sight failed ; he remained with defective sight for two years, then recovered his sight completely. Recognising this case as one of Leber's family axial neuritis, Mr. Nettleship told him he was not likely either to recover his sight or to get worse, and he did not see him again. However, in May of this year, Mr. Doyne had under his care this patient's brother for the same kind of amblyopia, and having heard that Mr. Nettleship's patient had recovered, wrote to him to enquire, the result being that the patient stated that his sight began to improve some nine months after it had failed, and that in a few months it was good enough for him to read for ordination in December of the same year, and that he had since been appointed headmaster of a large school. He was then able to read the equivalent of J. 1, and had resumed smoking.

Mr. Nettleship pointed out that here there were four cases in two pairs of brothers, the sons of two sisters, two out of the four recovering completely.

In the discussion which followed the reading of this case, Mr. Adams Frost said he had seen a case of this kind this year, the patient being a young man, aged 23. It was a typical case with large central scotoma. This patient's brother had also been attended by Mr. Frost for the same condition and was stated to have recovered completely ; this, however, had not been verified.

Mr. Ormond said he knew of a case of partial recovery from Leber's atrophy. One patient, who was a non-smoker, had typical Leber's atrophy. The brother of this patient, after being thrown from a train, showed the same condition within six months of his accident and had to give up work. For some time the sight continued very bad indeed, but he had gradually recovered, until he had good peripheral vision with a large scotoma, and was in the same condition as regards his sight as his brother.

Mr. Johnson Taylor said he had recorded four cases of Leber's atrophy in the first volume of the *Transactions*, occurring in six sons.

Mr. Lawford had had one case of partial recovery in a patient, one of three brothers who were all affected. He recovered so much as to be able to read newspaper type and to have a vision $= \frac{6}{9}$ or $\frac{6}{12}$, and was quite able to resume his work ; later on he came complaining that his sight had again failed, but on close examination it was found as good as ever.

Mr. Nettleship could not say what treatment had been adopted in the cases of recovery, but he thought very little, if any.

Dermoid Cyst of the Orbit causing Complete Dislocation of the Eyeball.—Mr. H. A. Lediard. The patient, a man, aged 49, first noticed a prominence of his eye when 19 years of age. For the next ten years he could see perfectly, but during the next fifteen years the sight had failed and the protrusion of the eyeball had increased : the last five years the eyeball had become still more protruded, the sight had become lost, and the eye had caused great pain. On admission to hospital the left eyeball was found to be dislocated from the orbit and resting on the malar bone, showing also a downward displacement. The upper lid had been much thinned and the patient was unable to close the lids completely. The muscles appeared unaffected except the internal rectus, which allowed a slight external squint to take place. The cornea was commencing to slough and the lens was opaque. To the outer side of the orbit a distinct painless swelling existed, which was inelastic, with the overlying skin unaltered. The eyeball was removed and a large dermoid cyst evacuated, which had been located in a groove in the outer angle of the orbit. The sebaceous material contained in the cyst was also found filling up the antrum, as well as the entire cavity of the orbit behind the displaced eyeball. The contents of the cyst were found to be fatty *débris*, with flattened epithelial cells, but no hair. The writer referred to cases mentioned by Mr. Spencer Watson in the Report of the Proceedings of the Fourth Ophthalmological Congress in 1873.

In this case the cyst had grown at the external angular process of the frontal bone, and had grooved the orbital margin, showing an erosion of bone in the vicinity.

Mr. Doyne asked what was the state of the outer wall of the orbit. In a case he had read before the Society the outer wall was completely absorbed, and he had been told of a similar case by Mr. Collins, and he believed the view held was that the upper wall of the orbit was not absorbed, but that the dermoid had taken place through a deposit of bone in that situation.

Mr. Nettleship asked whether it was not the case that dermoids in the orbit were very often, if not usually, at the inner side and not at the outer. Dermoids of the skin were usually on the temple. He had removed more than one from the inner side, not very large but extending very deeply.

Mr. Lawford said he agreed with Mr. Nettleship in thinking that dermoids, when situated in the orbit, were usually at the inner and upper angle.

Mr. Fisher considered that Mr. Doyne's case was hardly intra-orbital, but a dermoid in which the outer bony wall of the orbit had failed to develop on account of the presence of the dermoid; so it was really a temporal dermoid which was partly in and partly out of the orbit.

Mr. Doyne said there was no doubt his was absolutely intra-orbital.

Reported by R. E. BICKERTON.

CLINICAL NOTES.

ELECTRIC OPHTHALMOSCOPE.—Of a recent and carefully devised form of the Electric Ophthalmoscope, Wolff (Berlin) writes an account, explaining its construction and detailing some of the advantages which he considers the instrument to possess as compared with the ordinary ophthalmoscope. The amount of light which can be thrown into the eye by means of it is so much greater that a view of the fundus can be obtained in cases in which the degree of opacity present in the media would prevent examination by the ordinary ophthalmoscope. The illumination of the fundus is superior, both in degree and in extent. The physiological light reflex of the macula is more extensive and more highly differentiated as seen with this instrument. The exact position of the macula can always be made out. Pulsation both in arteries and veins can frequently be seen in the physiological eye. Changes are seen in the light reflex of the macula following iritis, and which persist for a long time after the more evident symptoms have subsided. The value of being able to trace such changes is that we have thereby a further means of objective demonstration, and can therefore with greater certainty direct treatment.—*Annals of Ophthalmology*, x., 4.

Excision of the Sympathetic Ganglia for Optic Atrophy in Tabes.—In a patient who had developed optic atrophy in the course of locomotor ataxia, Dana of New York removed the three cervical ganglia on the less affected side. The patient, who was a man of about 50 years of age, was in the first stage of tabes; his atrophy had advanced so far that he was only able to read large type. Four weeks (!) after the operation the fields and the central acuteness of vision both showed distinct improvement. It seems that somewhat similar cases were reported by Suker in 1899, and by Ball in 1900, in which, after removal of the superior cervical ganglia only, little improvement was obtained. Dana's was the first in which all three ganglia were removed. As he himself says, "In optic tabes the outlook is so hopeless that we grasp at any measure that may by any possibility give relief," but this hardly justifies the performance of a dangerous operation which cannot by any possibility afford any relief. —*New York Medical Record*, July 12, 1902.

Contagious Ophthalmia in Schools.—Great efforts are being made in New York to limit, and so far as possible, to prevent, the spread of trachoma and other contagious forms of ophthalmia among the children of the asylums and residential schools of that city. In 1886, a Committee of the Academy of Medicine was appointed to investigate the matter, and their enquiries disclosed a melancholy state of affairs, but during the fifteen years which have since elapsed a marked improvement has been manifest, as is shown by R. H. Derby in a recent paper. For example, in certain of these schools, children with healthy eyes were to be found sleeping in the same dormitory with others affected by trachoma, and using the same lavatory. In one institution 203 cases of communicable eye disease were found among 409 children; in another there were only 105 children with healthy eyes out of a total of 357. In another, in which 40 per cent. of the children were affected, enquiry made it plain that while the disease was frequent enough among those who had been there but a short time, it was much more so among the seniors, so that the longer a child remained in the asylum the more certain was he to acquire disease; at that institution no isolation whatever was then practised. An Act for the better preservation of the health of children in institutions was passed by the legislature in 1886, in consequence of these disclosures, with most beneficial results; thus in one institution there was in 1886 17·7 per cent. of ophthalmia; in 1902, 2·5 per cent. In another, the decline was from 66·5 to 4·4 per cent, in a third from 18·3 to 1·6 per cent. Two others are more striking still in the proportion in which the children were attacked. The Protectory in 1886 showed 40 per cent. of ophthalmia, now there are only 3·7 per cent. which could be reckoned as contagious. These children, by law, are reported monthly to the Board of Health. On admission each child is examined, and on any sign of contagious eye disease is isolated at once in a special building, which is complete in itself both as residence and school. Even when they have recovered and are sent to the main school, such children always wash separately from the others, and are examined at regular stated intervals. No basins or tubs are used for washing in the whole institution, every child has his own towel and jet of water, and every month the eyelids of each inmate are everted and examined, as required by law. It is impossible to prevent the occurrence of trachoma in the school altogether, for in a certain proportion of the admissions the children are already affected; it is obviously impossible in certain institutions to refuse to receive all such, though exclusion is possible in others. The second of these institutions is St. Joseph's Asylum, in which in 1886, 58·34 per cent. of the 800 inmates were affected with trachoma. In 1902, there were only ten in whom communicable disease was present, making 1·2 per cent. of the present total number of inmates. Trachoma is present in no child under 12 years of age, but then from this school children already affected can be and are excluded. The paper from which we quote is full of interesting details, which we would gladly reproduce had space been available, but two facts stand out of which notice should be taken. The superintendent of the Institution for the Blind (N.Y.) is responsible for the statement that the number of children in that institution at the close of 1898 was 169, an actual decrease since 1886 of 47, and of course, considering the rapid growth of the population, a much greater relative diminution. This obviously implies an immense improvement in conditions, as well as an immense saving in human happiness and in productive labour; it means that a very large number of persons are in good health and economic activity who otherwise would not have been so. The other fact is, that in the densely populated counties of New York State the number of blind persons is one to every 2,500 of population, but in five rural counties there is one blind to every 650 of the population. This contrast between the urban and the rural districts, present probably to a greater or less extent in every civilised country, exists to a very striking degree in New York.—*New York Medical Record*, July 5, 1902.

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